

# Hoya Sections

A Complete study  
Revised October 2001

*by Dale Kloppenburg  
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## **Acknowledgments**

This study started out at the suggestion of David Liddle of Mareeba, Queensland, Australia. David called and encouraged me to write up the “Section Acanthostemma” since so many of its species were found in the Philippines where I have concentrated my studies. Many species have, over time, been placed in the incorrect section. It has been stated that the sections were useless and that few people understood them. Moreover, they were not being used as study tools in understanding this complex genus. My study of one section soon expanded to the study of all sections and their origin and organization.

It was not long before after much compiling, that I found I was generating as many questions as answers. Some questions I couldn’t answer. I was soon seeking help namely from Professor Benjamin Stone. Dr. Stone is working on the “Philippine Flora Project”, a full time job. In spite of time constraints, Ben took the time to provide me with invaluable assistance. He has been most gracious in giving me advice on organization, translations, form and substance and above all, motivation. I guess I should add education. I have found his “tutoring” process to be immeasurably valuable and worthwhile. I wish here to publicly express my deep gratification and thanks for all his assistance.

It is my wish that others will find herein a useful tool and stepping stone towards a fuller and better understanding of this complex Genus Hoya.

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P.S. I have room here to express my thanks to Dr. J.F. Veldkamp of Leiden, The Netherlands who took the time to point out a lot of errors and a conflict in my sectional key. Thanks to him these have now been corrected and entered.

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# Hoya Sections by Dale Kloppenburg

## I. Introduction

Under the International Code of Botanical Nomenclature (ICBN) a plant can be assigned to taxa of the following ranks below Genus and of higher status than species (in descending sequence): subgenus, sectio, subsectio, series, and subseries. To date the Genus *Hoya* has been subdivided into subgenera and sectio (sections). Since only one subgenera was ever designated I will discuss this later. The sectional divisions are established in an attempt to group species with recognizably similar characteristics together. By descriptions based on a species Type in each section it is hoped in this way to delineate as precisely as possible the probable phylogeny, and to bring out the salient structures which indicate relationships. A section is a taxonomic category. Sections if natural have evolved over time just as a species or genera has. As a better understanding of the entire complex of hoya species has grown so to have more sections been defined; several originally as genera in their own right. Eventually many of these genera were incorporated into the genus *Hoya*. Since they represented a delineated species or group of species it was natural that they were incorporated as sectional representatives of this complex genus.

Articles #21 and #22 of the ICBN establish the rules for subdivisions of genera. See appendix #1 for these specific rules.

These sections when organized and studied can be an invaluable aid to species identification. In addition through this grouping of species into sections a better understanding of the relationships of development and evolutionary progression should evolve. This work is not complete and additional sections need to be created. The section *Hoya* needs further delineation and division into additional sections to avoid what Dr. Ken Hill (1) has termed the "amorphous remainder or paraphyletic residue". Actually a sort of dumping ground for species which we are not able to classify within other sections. This is due mostly to the short comprehensive nature of this sectional description. Dr. Hill has added some additional delineation's. As for the need of further refinement and additional sections, I am establishing four new sections. (1) One further defines and differentiates a group of species loosely associated with the Section *Sperlingia* (Vahl) Miquel (*Acanthostemma*). Some of the included species have previously been placed in the Section *Otostemma* (Blume) Miquel. (2) One other to house the monotypic species *H. heuschkeliana* Kloppenburg. (3) another to segregate out the two presently known species which have rudimentary pellucid margins on their pollinia outer edges, namely *H. darwinii* Loher and *H. mitrata* Kerr. (4) The last to cover the species allied with *H. meliflua* (Blanco) Merrill.

The first sectional divisions of the Genus *Hoya* was made by G. Don in 1837, followed by Endlich in *Genera Plantarum* (136-1840) pub.? 1841, some references say 1838 and by Decaisne, Blume, Miquel & Zollinger, J. D. Hooker, K. Schumann, King & Gamble, S. H. Koorders, R. Schlechter and K. Hill. (see authors under Sectional descriptions).

## II. A List of Synonyms of *Hoya* R. Brown

- 1810 **Sperlingia** Vahl, Act. Hafn. 6: 112. Type: *S. verticillata* Vahl = (***Hoya verticillata*** (Vahl) G. Don).
- 1811 **Schollia** Jacq. f., Ecl. Pl. Rar. 1:5, t.2. Type: *S. crassifolia* J.F. Jacquin. = (***Hoya crassifolia*** Jacq.).
- 1834 **Physostelma** Robert Wight, Contributions to the Botany of India 39. P. wallichii Wight = (***Hoya campanulata*** Blume).
- 1834 **Pterostelma** Robert Wight, Contributions to the Botany of India p.39. Type: *P. acuminata* = (***Hoya acuminata*** Hooker f.).
- 1838 **Centrostemma** Decaisne, Annales Les Science Naturelles 9 #2:271 t.10-c. Type: *C. multiflorum* Blume = (***Hoya multiflora*** Blume).
- 1838 **Cyrtoceras** Bennett, Plantae Javanicae Rariorae p.90, t.21. Type: *C. reflexum* Bennett = (***Hoya multiflora*** Blume).
- 1843 **Cystidianthus** Hasskarl, Tijdschrift van. Natur. Geschieden Physiol. 10:125, Hoev. & de Vriese. Type: *C. campanulatus* (Blume) Hassk. = (***Hoya campanulata*** Blume).
- 1848 **Otostemma** Blume, Rumphia 4:30. Type: *O. lacunosum* Blume = (***Hoya lacunosa*** Blume).
- 1848 **Cathetostemma** Blume, Rumphia 4:30 Type: *C. laurifolium* Blume = (***Hoya laurifolia*** (Bl.) Decaisne).
- 1849 **Plocostemma** Blume, Museum Botanicum Lugduno-Batavum 1:59 fig.14. Type: *Pl. lasianthum* Blume = (***Hoya lasiantha*** Korth.).  
Mentioned by name in Rumphia 4:30 (Genus) by Blume (1848).
- 1849 **Acanthostemma** Blume, Museum Botanicum Lugduno-Batavum 1:57.  
No Type mentioned.

## III. The Type Descriptions of these Genera Follows

### **Acanthostemma** Blume

In Rumphia 4 (1848) 49-50. In Museum Botanicum Lugduno-Batavum 1 (1849) 57.

Calyx quinquepartitus. Corolla rotata, quinquefida, laciniis revolutis. Coronae staminea pentaphylla, gynostegio abbreviato adnata, foliolis sagittatis carnosae erectis, angulo

superiore in dentem antherea incumbentem producto. Antherae membrana stigmati incumbente terminatae. Pollinia basi affixa subdivergentia oblonga compressa, anguste marginata. Stigma apiculatum. Folliculi laeves. Semina plurima, ad umbilicum comosa. -- Herba pseudo-parasiticae, late in insulis Asiae tropicae et Nova Guinea dispersae, scandentes radicales: foliis oppositis vel verticillatis carnosa, umbellis vel racemis umbelliformibus saepe multifloris; floribus parvis fuscis vel dilute purpurascensibus.

Translation:

Calyx 5 parted. Corolla rotate, pentamerous, with the lobes revolute. Corona of 5 segments, adnate to the short gynostegium, segments sagitate, fleshy, erect, with the superior (inner) angle produced into a tooth, incumbent upon the anther. With the anther terminal membranaceous, incumbent upon the Stigma. Pollinia affixed at the base erect somewhat divergent, oblong with compressed narrow sides. Stigma apiculate. Follicles (seed pods) smooth. Many seeds with a hairy-tufted umbilicus. Herb, falsely parasitic, rooting climber, widely dispersed in insular Asian tropics and New Guinea; foliage fleshy opposite or verticillate (whorled); umbels or racemes shaped like umbels often many flowered; with flowers small dark or light (dilute) purplish.

**Cathetostemma Blume**

In Rumphia 4 (1848) 30.

Calyx quinquepartitus. Corolla rotata, quinquepartita, laciniis reflexis. Corona staminea pentaphyllia, gynostegio abbreviato adnata; foliolis scutiformibus, carnosius, erectis, convexis, basi bifidis, apice attenuatis et angulo interiore in dentem antherae incumbentem producto. Antherae membrana stigmati appressa terminatae. Pollinia ellipsoidea, compressa, basi affixa, erecta. Stigma umbonatum.--Frutex Timorensis, volubilis; foliis oppositis, oblongis lanceolatisve, coriaceis, subvenosis, glabris, supra petiolum glanduliferis; umbellis brevissime pedunculatis, axillaribus et interpetiolaribus, multifloris; floribus longissime pedicellatis, mediocribus, flavo-viridulis.

Translation:

Calyx pentamerous. Corolla rotate, pentamerous, the lobes reflexed. Corona of 5 segments, adnate to the short gynostegium; corona segments shield shaped, fleshy, erect, convex, with the base bifid, at the apex narrowed and with the lower side, prolonged into a tooth lying upon the anther. With the terminal membrane of the anther appressed to the stigma. Pollinia ellipsoidal, compressed attached at the base, erect. Stigma dome shaped. A shrubby climber of Timor, with leaves opposite, oblong lanceolate, leathery, slightly veined, glabrous, with glands above the petiole; umbels very shortly peduncled, from the axils and between the petioles, many flowers on very long pedicels, medium-size, yellow-green.

### **Centrostemma Decaisne**

In Annales les Science Naturelles 9 #2 (May 1838) 271.

Calyx quinquepartitus. Corolla profunde quinquefida, reflexa, circa basin gynostegii in annulum barbatum prominens. Corona staminea pentaphylla, gynostegio elongato superne adnata; foliolis carnosis, arrectis, supra depressis, marginibus subtus revolutis, basi in cornu v. calcar patens v. recurvatum productis, apice in dentem stigma superantem attenuatis. Antherae membrana stigmati appressa terminatae. Pollinia basi affixa, erecta, oblonga, compressa, hinc pellucido-marginata. Stigma apiculatum. Folliculi solitarii, elongati, cylindracei, laeves. Semina comosa. --Frutices volubiles in Archipelago Indico, Moluccis et Philippinis crescentes; foliis oppositis, coriaceis, subvenosis, glabris; umbellis pedunculatis interpetiolaribus v. terminalibus, multifloris; floribus saepe majusculis, flavidis.

#### Translation:

Calyx pentamerous. Corolla deeply divided into 5 reflexed lobes, with a prominent beard about the base of the gynostegium. Corona of 5 stamens, attached at the upper part of the elongated gynostegium; corona segments fleshy, upright, depressed above, with the lower margins inrolled, at the base prolonged into a spreading or horn-like spur, at the apex narrowed into a tooth longer than the stigma. With the terminal membrane of the anther oppressed to the stigma. Pollinia affixed at the base, erect, oblong, compressed, here with a sub transparent margin. Stigma apiculate. Follicles single, elongate, cylindrical, smooth. Seed hairy-tufted. ---The climbing plant growing in the Indian Archipelago, the Moluccas and the Philippines with leaves opposite, leathery, somewhat veined, glabrous; with the many flowered umbels pedunculate between the petioles and terminal. With flowers often rather large, yellowish.

Note: this and the following genus (Cyrtoceras) are to be combined as they have the same Type species. Cyrtoceras becomes a heterotypic Synonym.

### **Cyrtoceras Bennett**

In Pl. Jav. Rar. (4-7 July 1838) 90 t.21.

Corolla rotata, quinquefida, reflexa. Tubus stamineus longe exsertus; corona pentaphylla, foliolis carnosis lanceolatis erectis, basi in cornu recurvatum productis. Antherae membrana terminatae; massae pollinis basi affixae, conniventes, compressae. Stigmatis discus depressus, papilla acutiuscula. Styli elongati. Frutex. Folia opposita membranacea. Umbellae interpetiolares vel terminales, pedunculatae, multi-florae. Flores majusculi, annulo corollae faucis barbato.



Translation:

Corolla rotate, pentamerous, the lobes reflexed. Staminal tube long erect; corona pentamerous, its segments lanceolate, erect with the base produced into a recurved horn. With the anther terminating in a membrane, with the pollen masses attached at the base, connate, compressed. Stigma disc depressed. Style elongated. A shrub with opposite, membranaceous leaves. With the umbels between the petioles and terminal, pedunculate, many flowered. Flowers rather large with a hairy ring in the throat..

**Cystidianthus Hassk.**

In Tijdschrift van Natur. Geschieden Physiol. 10 (1834) 125.

Calyx quinquepartitus. Corolla subcampanulata, repande-quinquedentata, primo patens, dein reflexa. Corona staminum pentaphylla, gynostegio abbreviato connata; foliolis carnis, patentibus, compressis, marginibus subtus revolutis, angulo exteriori assurgente, interiore in dentem antherae incumbentem productis. Antherae membrana stigmati appressa terminatae. Pollinia basi affixa, erecta, oblonga, compressa, hinc pellucido-marginata. Stigma convexum, pentagonum, muticum. Folliculi abortu solitarii, elongati, cylindracei, laeves. Semina comosa. --Frutices Archipelagi Indici, facie Centrostemmatis.

Translation:

Calyx pentamerous. Corolla somewhat campanulate, shallowly 5 lobed, at first the lobes spreading, later reflexed. Corona of 5 segments, fused to the short gynostegium; corona segments fleshy, spreading, flattened with the lower margins inrolled, the exterior angle rising upward, interior produced into a tooth lying upon the anther. With the terminal membrane of the anther appressed to the stigma. Pollinia attached at the base, erect, oblong, flattened, here with an almost transparent margin. Stigma convex 5-sided blunt. With the seed pod solitary through abortion, elongate, cylindrical, smooth. Seeds hairy-tufted. Shrubs of the Indian Archipelago with the general appearance of a Centrostemma.

Note: this genus becomes a heterotypic synonym of the genus Physostelma Wight since they both have the same type species.

**Otostemma Blume**

In Rumphia 4 (1848) 30.

Calyx quinquepartitus. Corolla rotata, quinquefida, laciniis revolutis. Corona staminea pentaphylla, gynostegio elevato adnata; foliolis navicularibus, carnis, divaricatis, supra

concavis, angulo interiore in dentem antheram superantem producto, subtis appendice deorsum bidentata auctis. Antherae stigmati incumbentes, apice simplices, acutae. Pollinia basi affixa, erecta, approximata, linearia, compressa. Stigma obsolete apiculatum. Folliculi laeves. Semina plurima, ad umbelicum comosa. - Herba Archipelagi Indici, in arboribus radicans; foliis oppositis v. radius verticillatis, carnosus, glabris; umbellis longiuscule pedunculatis; floribus parvis, albidis.

Obs. Ad Hoya recedit dentibus coronae stamineae supra antheras productis, ejus foliola subtus esuicata singula appendice bidentata sunt praedita, nee non antheris simpleibus haud membrana terminatis. Alias quoque stirpes sub Hoya militantes ad hoc Genus referendas esse probabile videtur; qua de re dilligens florum exploratio docebit. Nomen derivatum ad oto, aures, et stemma, corona.

#### Translation:

Calyx pentamerous. Corolla rotate pentamerous, the lobes revolute. Corona of 5 segments, adnate to the elevated gynostegium; corona segments boat shaped, fleshy, spreading widely, above concave, with the interior angle prolonged into a tooth overtopping the anthers, and beneath with 2-toothed enlarged, appendix bent downward. With the anthers incumbent on the Stigma, with the apex simple, acute. Pollinia attached at the bases, close together, linearly compressed. Stigma scarcely apiculate. Follicles smooth. Seeds many, with a hairy-tufted umbilicum. Herbs of the Indian Archipelago, rooting in trees; leaves opposite or rarely whorled, fleshy, glabrous, umbels with moderately long peduncles; with small white flowers.

Observation. Differing from Hoya in the corona segments being produced above the anthers, and each segment with a groove beneath but furnished with a single 2-toothed appendix, and also the simple anthers not terminating in a membrane. Each Hoya of the Genus till now was grooved below, it seems probable this represents a mutant; but the floral structure must be diligently observed. The name is derived from oto, ear, and stemma, crown.

### **Physostelma Wight**

Note: Section Cystidianthus (Hasskarl) King & Gamble is a Synonym based on the same Type species. In addition King & Gamble in Materials for the Flora of the Malaya Peninsula, it was used as a Section but without description.

In Contributions to the Botany of India (1843) 39.

Calyx 5 partitus. Corolla rotata, patens, repande 5-dentata Corona stamineae 5-phylla, foliolis inflatis, antheris oppositis. Antherae membrana terminatae. Filamenta e basi ad apicem bipartita, cruribus cum crure segmenti utrinque proximi arcte coalitis, filamenta 5

antheris coroneaeque foliis alternantibus corpusculis stigmatibus oppositis efformantibus. Massae pollinis basi affixae, erectae, subcylindricae. Stigma depressum.--Frutex volubilis Indici v. javanici. Folia opposita carnosae; umbellae laterales longiuscule pedunculatae, flores magni.

Translation:

Calyx pentamerous. Corolla rotate, spreading, the 5 lobes spreading wavy. Corona of 5 segments, these are inflated, with opposite anthers. Anthers terminated by a membrane. Filaments 2-parted from the base to the apex, the shanks with each segment on both sides closely approaching its neighbor, filaments 5 with the anthers and corona segments alternating, together forming a body opposite the stigma.. With the pollen masses basely attached, erect, almost cylindrical. Stigma depressed. --Indian and Java climbing shrubs. Leaves opposite, fleshy; umbels lateral on long peduncles, few flowered, flowers large..

**Plocostemma Blume**

In Museum Botanicum Lugduno-Batavum 1 (1849) 57. Name mentioned in Rumphia 4 (1848) 30.

Calyx quinquepartitus. Corolla quinquefida patens v. reflexa, intus ad basin stuposa. Corona staminea pentaphylla, gynostegio subsessili adnata, foliolis carnosis, erectis, compressis, subtus conduplicatis, angulo interiore in dentem antherae incumbentem producto. Antherae membrana stigmati incumbente terminatae. Pollinia basi affixa erecta, oblonga, compressa, hinc marginata. Stigma apiculatum. Folliculi...—Frutices Archipelagi Indici, volubiles; foliis oppositis coriaceis subvenosis glabris; umbellis pedunculatis terminalibus v. interpetiolaribus multifloris.

Translation:

Calyx pentamerous. Corolla pentamerous the lobes spreading or reflexed, near the base inside with a tuft of matted hairs. Corona pentamerous, adnate to the somewhat sessile gynostegium, the compressed segments fleshy, erect, pleated beneath, with the interior angle prolonged into a tooth lying upon the anther. With the anther terminating in a membrane lying upon the stigma. Pollinia erect, oblong, compressed, attached at the base here marginate. Stigma apiculate. Follicles not known. Twining shrub of the Indian Archipelago; leaves opposite, leathery somewhat veined, glabrous; with the umbels pedunculate terminal or between the petioles, many flowered.

**Pterostelma Wight**

In Contributions to the Botany of India (1834) 39.

Corolla rotata, 5-fida. Corona staminea 5-phylla; foliolis membranaceis lateribus reflexis, angulo interiore in dentem subulatum erectum producto. Antherae membrana terminatae. Massae pollinis erectae, aproximatae, ad dorsum corpusculi basi afixae. Stigma apiculatum. -- Frutex volubilis ? aut decumbens ? Folia opposita, oblonga, acuminata, carnosae. Flores majusculi. Corolla alte 5-fida, segmentis lineari-lanceolatis, tubo piloso. Coronae foliola lata, lateribus arcte reflexis marginibusque conniventibus, ita ut Papilionis sedentis alae.

(In English when this was considered a separate genus) This genus is allied to Hoya both in habit and in the structure of the flowers, differing principally in having foliaceous in place of fleshy crown-leaves, and in the dorsal not lateral attachment of the pollen masses to the corpuscle.

#### Translation:

Corolla pentamerous, rotate. Corona 5-segmented, the segments membranaceous, with the sides reflexed, the interior angle produced into subulate tooth. With the anther terminating in a membrane. Pollen masses erect, close together, basely attached to the back of the corpuscle (retinaculum). Stigma apiculate. --Twining shrub or prostrate ? Leaves opposite, oblong, acuminate, fleshy. Flowers somewhat large. Corolla not deeply 5 lobed, with the lobes linear-lanceolate, the tube shaggy within. Corona segments broad, the sides strongly reflexed and the margins connivent, in the manner of the wings of a sitting butterfly's.

#### **Schollia Jacq. f.**

In Ecl. Pl. Rar. 1:5 t.2. (1811). ( *unable to acquire a copy of the original text*).

#### **Sperlingia Vahl**

In Act. Hafn. 6:112. (1810).

#### **Sperlingia**

Botaniken synes Konig Christian den 4de meget at have yndet. Han stiftede ikke allene den forste offentlige botaniske have her i Landet, men anlangde og en stor sig selv ved Rosenborgs Slot. Til Opseer over denne satte han Otto Sperling. Vel harbenne ikke efterladt sig andet Beviis paa sin kundskab om Værter, end blot en Fortegnelse over Haven han forestod, Hortus Christianæus Hafn., men hans Samtids, der vare i Stand til at bedømme ham i denne henseende, ansaa ham for at være vel bedandret deri. Maskee, ifald han ikke var bleven idbevirket med Corfitz Ulfeld, han havde aflagt flere prover paa sin kundskab. Mange gives, som ikke have bidraget mere, og adskillige mindre til Bidenskabens, Underdelse, end Sperling, efter hvilke man har opkaldet planter. Teg troer, at det saaledes kan indskyldes, at jeg har villet bevare denne Minde om Botanik

Slægten, som jeg har benævnt efter ham, betør ligesom forrige til Contortæ, udmærker sig ved de bvrige Slægter ved at de aflange kronblade ere baade, hvorved de faae et Udseende, som om de vare dobbelt trekantede, den ene Vinkel indad vendt, de to udad, og hver af disse endende sig i en lidt længere fremstaaenden Spidse. Saavel Figuren af Nummularia lactea major Rumph. amb. 5. t. 175., som Blomstermaaden og Beskrivelsen af koronen, passer saa fuldkommen til de 2de Værter, som jeg her leveter beskrevne, at jeg ikke tvivler om, at de hore til denne Slægt. Teg anseer endog den han kalder Nummularia lactea major tab. 175. f. 1. at være samme med den jeg kalder Sperlingia opposita.

Character Essentialis.

Contorta. Nectarium stellula simplex genetilia tegrens. Petala 5, apice marginibusque inflexis triangularia, plana, conduplicata.

Translation: (by Dr. Bertel Hansen of the Botanical Museum at the University of Copenhagen, Denmark).

.....King Christian the 4th apparently loved botany. Not *only* did he establish an official Botanical Garden in the county, but he also arranged a private garden at the Rosenborg Castle. To supervise his private garden he employed Otto Sperling. This man did not leave other proof of his knowledge about plants *except* a mere list (of plants) of the garden, he supervised, *in Hortus Christianaeus Hafn.(iensis)*, but his contemporaries, capable of evaluating him in this connection, considered him to be well founded in this (i.e. knowledge of plants). May be, if he had not been connected with Corfitz Ulfeld (sentenced for high treason), he would have given more examples of his knowledge. Plants have been named after many, who did not contribute more, and several less, to the spread of science, than Sperling. I think, it may therefore be excused that I have wanted to preserve the memory (of Sperling as a botanist).

The genus, I have named after him, belongs as the former to Contortae, distinguished from the other genera by the elongate petals being in the apex and laterally inflexed hereby appearing double triangular, one angle pointing inwards, two outwards, and each of these terminating in a slightly protruding tip (very hard to imagine; the Latin text is easier). The illustration of Nummularia lactea major Rumph. amb. 5. t. 175., and the description of the corolla are in close agreement with the 2 plants, I describe here, and do not doubt that they belong to this genus. I even consider the one he calls Nummularia lactea major tab. 175. f. 1. to be the same as I call Sperlingia opposita. (bracketed remarks are Dr. Hansen's) *italics are mine*.

Essential Character.

Contort. The simple star shaped nectary covering the genetilia. Petals 5, flat with the triangular apices and margins inflexed, rolled longitudinally (lengthwise).

#### IV. Sections of *Hoya* R. Br. Originally Published as Such

- (1) Invalid names (not usable under the current nomenclature rules):
- 1837 **Hoyae Verae** G. Don, General System of Gardening and Botany 4:125, no type mentioned.
- 1856 **Eu-Hoya** Miquel, Flora van Nederland Indië 1:516, no type mentioned.
- 1885 **Euhoya** Hooker, J. D., Flora of British India 4:53.
- (2) Valid names:
- 1837 **Hoya** in General System of Gardening and Botany, G. Don 4:125. Type: **Hoya carnosa** R. Brown. The section was automatically created (as an "autonym") with the division of the Genus into sections. (see appendix under Article 6.8 and 22.2).
- 1883 **Ancistrostemma** J. D. Hooker, in Flora of British India 4:53. Type: **Hoya edeni** King ex Hooker.
- 1911 **Kloiphora** King, in Journal of the Royal Asiatic Society, Bengal Branch "Flora of the Malayan Peninsula" 2:559. Type: **Hoya curtisii** King & Gamble.
- 1913 **Oreostemma** Schlechter, in Botanische Jahrbücher 50:105. Type: **Hoya oreostemma** Schlechter p.126.
- 1913 **Eriostemma** Schlechter, in Botanische Jahrbücher 50:106. Type: **Hoya coronaria** Blume p.135.
- 1916 **Peltostemma** Schlechter, in Beihefte zum Botanischen Centralblatt 43 #2 p.15, "Neue Asclepiadaceen von Sumatra & Celebes" Type: **Hoya maxima** (Karst.) Warburg.
- 1993 **Skenostemma** Kloppenburg (here published) Type: **Hoya heuschkeliana** Kloppenburg.
- 1993 **Rudimentalia** Kloppenburg (here published) Type: **Hoya darwinii** Loher.
- 1993 **Amblyostemma** Kloppenburg (here published) Type: **Hoya meliflua** (Blanco) Merrill.

#### V. Names of Genera Placed at the Rank of Section

- 1848 **Physostelma** (Wight) Blume, in Rumphia 4:32. Type: **Hoya campanulata** Wight. Synonym *Cystidianthus* (Hasskarl) King (genus placed at the rank of section 1901).
- 1856 **Otostemma** (Blume) Miquel, in Flora van Nederlandsch Indië 1:525, Type: **Hoya lacunosa** Blume.
- 1856 **Sperlingia** (Vahl) Miquel, in Flora van Nederlandsch Indië 1:523 Synonym: *Acanthostemma* Blume. Type: **Hoya verticillata** (Vahl) G. Don.

- 1856 **Cathetostemma** (Blume) Miquel, in l.c. (as the proceeding one) p.525. Type: **Hoya laurifolia** (Bl.) Decaisne.
- 1856 **Plocostemma** (Blume) Miquel, in l.c. p.526. Type: **Hoya lasiantha** Korthals.
- 1883 **Cryptoceras** (Bennett) Hooker f., in Flora of British India p.52. Type: **Hoya multiflora** Blume. A misspelling of *Cyrtoceras* Bennett.
- 1883 **Pterostelma** (Wight) Hooker f., l.c. p.53, Type: **Hoya acuminata** Wight.

These sections when organized and studied can be an invaluable aid in species identification. Understanding the characteristics governing how and why hoyas species fit into each section is a valuable aid in placing a name to a unknown hoyas plant. To disregard these sectional characteristics entirely is to fall into the trap of false identifications. As with most classification structures, becoming familiar with them greatly aids in our understanding of species relationships. A note of caution: it does not follow that every species placed in a section by an author actually belongs there. All of us are prone to make misjudgments, misunderstandings and incorrect conclusions (there are quite a number in the literature). Furthermore it may be possible to refine the sections and/or add new ones by closer study. By constant correction and refinement, progress will be made toward better, clearer classification. This will lead to greater understanding of the complexities and beauty within the Genus *Hoya*.

Note: Miquel placed *Sperlingia* and *Acanthostemma* Genus (as a synonym) together in a section. In Dec. 1993 after studying the description of *H. verticillata* (Vahl) Miquel it became evident to me that this species was in the Section *Hoya*. Dr. J.F. Veldkamp of the Rijksherbarium in The Netherlands obtained the original publication of the Genus *Sperlingia* along with Vahl's species descriptions. This confirmed that this genus was based not on bilobed coronal hoyas species, but on species in the Section *Hoya*. Subsequently the two species *Sperlingia verticillata* Vahl and *S. opposita* Vahl ((*H. verticillata* (Vahl) Don and *H. opposita* (Vahl) Don)) were determined by Ruurd van Donkelaar (also in The Netherlands) to be *Hoya parasitica* Wall. ex Traill\*. The implication then is that all the bilobed species of hoyas included by Miquel under the Section are incorrectly placed there. Thus the formation of a new hoyas section to house these bilobed species. This new section was created in April 1994 by me and is named *Hoya Section Acanthostemma* (Blume) Kloppenburg. Its type species is *Hoya rumphii* Blume ex Hooker f..

\* 12/2001 (DK) I now believe this determination to be incorrect and both species are not identical and neither are *H. parasitica*.

## VI. A Key to the Hoya Sections

by Dale Kloppenburg

- 1a. Leaves not paired, circular (shield -shaped) imbricate, one aborts  
 .....Section **Peltostemma** Schltr..

- 1b. Leaves paired, opposite,
  - 2a. Corona scale outer lobe below, not sulcate; pentamerous skirt (annulus) and 2 teeth like projections pointing away from the median line  
 ...Section **Otostemma** (Blume) Miquel.
  - 2b. Corona scales sulcate below, no pentamerous skirt,
    - 3a. Flowers small under 1.6 cm. in diameter flattened, natural form much smaller,
      - 4a. Corona scales almost columnar .....Section **Oreostemma** Schltr.
      - 4b. Corona scales otherwise.
        - 5a. Corona scales outer lobe raised above inner lobe, corolla reflexed, subtended by an inflexed annulus.....Section **Kloiphora** King.
        - 5b. Corona inner lobe higher than outer lobe, corolla not reflexed, no annulus present,
          - 6a. Corolla urceolate.....Section **Skenostemma** Klopp..
          - 6b. Corolla revolute.....Section **Acanthostemma** (Bl.) Klopp..
    - 3b. Flowers larger than 1.6 cm. flattened,
      - 7a. Pollinia with rudimentary or no pellucid edge,
        - 8a. Pollinia with no pellucid edge,
          - 9a. Translators long and twisted, affixed centrally or above to the retinaculum; column long woolly matted.....Section **Eriostemma** Schltr..
          - 9b. Translators not twisted, narrow, basely affixed to retinaculum, gynostegium sessile.....Section **Cathetostemma** (Blume) Miquel.
        - 8b. Short rudimentary edge, pollinia stubby.....Section **Rudimentalia** Klopp..
      - 7b. Pollinia with well developed pellucid sterile edge.
        - 10a. Corona scales very upright, long inner lobes.
          - 11a. Prominent beard at base of gynostegium, column long, inner corona apex attenuate, flower mid-size.....Section **Centrostemma** (Decaisne) Hooker.
          - 11b. Column sessile, bald, inner corona apex 2-fid incurved, hooked,  
 .....Section **Ancistrostemma** Hooker f..
        - 10b. Corona scales otherwise, short inner lobes,
          - 12a. Corona scales outer lobe erect,
            - 13a. Calyx small, lobes 2 mm. long,
              - 14a. Corolla densely woolly at base, reflexed, coronal outer lobe erect.....Section **Plocostelma** (Blume) Miquel.
              - 14b. Corolla not woolly at base, campanulate, coronal outer lobe raised  
 .....Section **Physostelma** (Wight) Blume.
            - 13b. Calyx large, lobes +/- 8 mm. long .....  
 .....Section **Pterostelma** (Wight) Blume
          - 12b. Corona scales horizontal,
            - 15a. Corolla revolute, coronal outer lobe obtuse,  
 .....Section **Amblyostemma** Kloppenburg
            - 15.b Corolla rotate, corona outer lobe tapering (acute) .....Section **Hoya**



## VII. Sections Accepted

I here present the sections in the order in which they appear in the key with an English translation and possible discussion. They are as follows:

### Section *Peltostemma* Schlechter

In Beihefte zum Botanischen Centralblatt 34 (1916) 5.

*Hoya maxima* (Karst.) Warburg together with *Hoya imbricata* Decaisne from the Philippines constitute the section, which I here name *Peltostemma*, because of the shield-forming leaves, as well as in the habit (of growth), but also the structure of the blooms which are remarkably characteristic. The apparently dovetailed (imbricate) regular, almost circular, close-fitting leaves, which are fastened to the substrate, are pretty little things and stand upon a pedestal, complete growing leaf pairs, that in their arrangement are closely fitted in such manner, botanically speaking that resemble the *Conchophyllum* and for sure the *Dischidia* species of the Section *Collyris*. In the blooms the Section *Peltostemma* is distinguished through the inclined corona scales and the long extended anther appendages. In addition the stigma head is hollow on the point and slow to open in comparison to the rest of the sections. Type species (designated here) **Hoya maxima** (Karst) Warburg.

### Section *Otostemma* (Blume) Miquel

Section 4. *Otostemma* Miquel Flora van Nederlandsch Indië 1:525.

Flowers small white; corolla revolute; corona scales boat shaped, below are two tooth-like processes. Anther apex acute. I add that the most prominent character of this section is the pentamerous skirt which hangs from the base of the outer corona scale lobes and lack of sulcation below. Type species for the section is **Hoya lacunosa** Blume.

### Section *Kloiphora* King

In Journal of the Royal Asiatic Society, Bengal Branch 2:53.

Corona-processes with lower lobe globose, hollow; upper shorter-curved; corolla-tube with a broad annular ring (corolline corona?). Type for the section is **Hoya curtisii** King & Gamble.

### Section Skenostemma Kloppenburg

*Sect. nova.* Pedunculus pedicellisue brevis, floribus parvibus, corolla urceolata laciniis recurvis, coronae stamineae phylla lateris bifida. Skeno = covered and stemma = crown. The covered crown hoya.

Found in the Philippines with at least two color forms. Type species: **Hoya heuschkeliana** Kloppenburg, Pancho #2175, CAHP. (see under Sectional descriptions for further delineation's).

### Section Acanthostemma (Bl.) Kloppenburg

In Hoya Section Acanthostemma (Blume) Kloppenburg (1994) 2. The species *Hoya rumphii* Bl. ex Hooker f..

Description same as for the Genus Acanthostemma Blume in Rumphia 4 (1848) 49-50.

### Section Eriostemma Schlechter

In Botanische Jahrbücher 50 (1913) 106 & 135.

Translated from the German 106:

Section VII. **Eriostemma** the stems and leaves with all surfaces (parts) covered with short soft hairs; in other respects its blooms possess marked sharp characteristics..... The gynostegium stands upon a column which goes down into the crown of the collar of the corolla which is covered with shaggy cottony hairs. The corona scales are comparatively short. The blooms are large or very large with a well developed thickly hirsute calyx. Type species of the Section is **H. coronaria** Blume.

Translated from 135:

Section VII. Eriostemma Schlechter. I thought it best to present here this distinctive section *Eriostemma*. This section is so well and sharply different, that one could consider whether or not to regard it as a separate sub-genus. I have so far presented above briefly the main points, but now I wish to present them once again in more detail. In habit there is a strong similarity that can be found with *EU-Hoya*, but the branches are softer and more fleshy and consistently with more or less soft hairs. The peduncles are extraordinarily thick and soft textured, the calyx as with *Pterostemma* more strongly structured, and the large hairy blooms are likewise fleshy. The gynostegium with the corona scales stand upon a woolly matted column that is the outgrowth formed of the filaments, which are united with the corona tube. The pollinia are distinguished (marked)

as opposed to the other *Hoya* species by means of the fact that the translators have undergone a strong development and exhibit a twist; also the retinaculum is rather large. The pollinia are more club shaped and moreover do not have the keel on the outer edge, characteristic of other *Hoya* sections.

The number of species belonging to this section is still small, but certainly with the wider search into the Malay-Papua Flora Sphere, many yet belonging here will be added.

For example the most western species *H. coronaria* Blume, is to be considered which comes from the Malayan Peninsula and Sunda Islands, as is known. *H. ariadna* Decaisne is described from the Island of Amboina. Two more unpublished species I know of come from the Philippines and the Celebes, the others are from Papua. Of the latter are *H. purpurea* Blume and *H. neo-guineensis* Engler from Dutch New Guinea and *H. guppyi* Hemsl. as well as *H. affinis* Hemsl. come from the English Solomon Islands. In the German parts of Papua, I know of at present the four species mentioned here, namely *H. purpurea* Blume, *H. hollrungii* Warburg, *H. gigas* Schlechter and *H. lauterbachii* K. Schumann. The first of these four species I know from locations in close proximity to the sea coast, but they also go further inland into the forests of the hills, to about 300 meters altitude. The other three species remaining of the section are inhabitants of the hill forests, and are likewise terrestrial growers, but with their vines often enveloping whole bushes and small trees. In particular they are found along stream and forest edges.

### **Section Cathetostemma (Blume) Miquel**

Section V. Cathetostemma in Miquel, Flora van Nederlandsch Indië, 1 (1856) 525.

#### Translation:

Flowers midsize, yellowish green, corolla lobes reflexed, corona scales sickle-shaped, convex, 2 parted at the base, stigma dome-shaped. Type for the section is ***Hoya laurifolia*** (Bl.) Decaisne.

### **Section Centrostemma (Blume) Hooker**

Section 1: in Flora of British India 4 (1883) 52.

Note: This section was named by J. D. Hooker Section Crytoceras, evidently a misspelling of Bennett's Cyrtoceras. This is based on a genera which is a heterotypic synonym of the Genus Centrostemma. In addition to these two errors the status of this species (or group of species) as being in the Genus Hoya is in question.

Corolla reflexed, lobes longer than broad, column stipitate; coronal-processes very long, erect, with a long spur diverging from the base of each. Type for the section is **Hoya multiflora** Blume.

### **Section Rudimentalia Kloppenburg**

*Sect. nova.* Umbellae multiflorae, flores glabrae magnae glaberrimae nitidae, corolla profunde lobata tubo perbrevis; lobi cordato-ovati, reflexi. Coronae foliola erecte, triquetra-conicae, magnae, subtus usque ad basin sulcatae, pollinia subcompressa in glandulo rhomboideo fere sessile, sterilis margine brevis vel rudimentalis. Pollinia with rudimentary pellucid steril margine (between full edged and none).

Type species for the section is **H. darwinii** Loher.

### **Section Ancistrostemma Hooker**

In Flora of British India 4 (1883) 53. In English:

Corolla reflexed, lobes longer than broad. Column sessile; coronal-processes gibbous and 2-lamellate below, produced upwards into long erect points, each with a 2-fid incurved hooked tip. Type species is **Hoya edeni** King ex Hooker.

### **Section Pterostelma (Wight) Hooker**

Hooker, J. D. in Flora of British India 4 (1883) 53.

Corolla reflexed, lobes longer than broad. Column sessile, obconic; coronal-processes laterally compressed, semi-cordate, 2-winged, with an erect subulate point in the inner angle. *Plocostemma* Blume.

Type species is **Hoya acuminata** Hooker f.

Note: Hooker has placed this with Blume's Genus *Plocostemma*. The sections, however, are based on different type species. In addition the two descriptions are different. As pointed out by Dr. R. Schlechter they differ in their calyx. I feel this alliance is incorrect.

Translated from Schlechter in Botanische Jahrbücher 50 (1913) 124-125.

Section IV **Pterostelma** (Wight) Hooker, distinguished through the corona scales that are deeply (strongly) bent upwards, and whose outer parts stand rather erect (straight up), opposed to this the forward extremity stretches up to the anther apex. The blooms are like the previous section, (*Plocostemma*) rather conspicuous with open corolla, only the calyx is different, the segments in this section are larger throughout. Type of the section is for the Western species, *H. acuminata* Hooker f. (*Pterostelma acuminata* Wight), for the

Eastern species *H. albiflorum* Zipp. (*Pterostelma albiflorum* Blume). Type is **Hoya acuminata** Wight.

Hill in Telopea 3 (2) 1988 adds the following data. Peduncles ageotropic. Pedicels equal. Corolla campanulate. Coronal scales ovate concave above, inner angle apiculate, outer angle rounded. Caudicles unwinged. Mesophyll differentiated. Epidermal spotting absent.

### Section *Physostelma* (R. Wight) Blume

Blume in Rumphia 4 (1848) 32 (as *Physostemma*).

The leaflets of the staminal corona somewhat inflated, with revolute margins, below with a gaping longitudinal fissure.

From Schlechter's German in Botanische Jahrbücher 50(1913) 105.

Section VI. ***Physostelma*** (Wight) Bl. contains the species with the broad bell shaped corolla, and a corona which reminds one of *Eu-Hoya*, which is rarely somewhat compressed laterally. Perhaps subsequently two sections will be needed here, in which case a section named for the species with the laterally compressed corona lobes, as seen from above, will be needed. Viewed from above the corona looks small, the calyx is always small. The blooms are rather large, at times very large. Type species of the section is ***H. campanulata*** Blume.

Hill in Telopea 3 (2) (1988) 244/246 adds: Peduncles ageotropic. Pedicels equal. Corolla campanulate. Coronal scales oblong-linear, rounded above, inner angle acute, produced forward, outer angle rounded, produced forward. Caudicles unwinged. Mesophyll strongly differentiated. Epidermal spotting absent.

### Section *Oreostemma* Schlechter

In Botanische Jahrbücher 50 (1913) 106.

Translated from the German:

Section V. ***Oreostemma*** is at the present the only one known to me by the species here described, which is hereby distinguished through the almost cylindrical fleshy corona scales with the outer parts almost completely bent perpendicularly (vertically) upwards, so that the forward as well as the other end falls off abruptly to the anther (extremity) apex. The blooms are midsize (medium large) with small calyx, the corolla, bent back strongly. Type species of the section is ***H. oreostemma*** Schlechter.

### Section **Plocostemma** (Blume) Miquel

In Miquel Flora van Nederlandsch Indië 1 (1857) 526.

Section 6. Corolla somewhat large, with hairy-tomentum near the throat and at the base of the flap hairy-tomentose, corona scales erect, pleated below; stigma apiculate. Leaves often slender, fleshy, and membranaceous when dry.

Type species is **Hoya lasiantha** (Bl.) Korthals.

Translated from Schlechter's German in Botanische Jahrbücher 50 (1913) 105.

Section III. **Plocostemma** (Blume) Miq. containing only a few species with strongly open corollas and large upright, laterally compressed corona scales, with the forward extremity stretched upward to the anther extremity. The blooms are rather large and pretty to look at, the calyx is small. Type of the section is **H. lasiantha** (Blume) Koth. (*Plocostelma lasianthum* Blume).

### Section **Amblyostemma** Kloppenburg

*Sect. nova.* Folia crasso-carnosa utrique glabra, marginibus reflexa, pedunculi breves petiolo breviores, corolla cum lobis revolutis, extus glabra, intus papillisa. Coronae lobi crasso-carnosi dorso canaliculati, supra concavo-excavati cum tuberoello parvo in cavitate; subtus sulcatis, stigmatibus apiculatis, flores magna. Type species: **Hoya meliflua** (Blanco) Merrill.

### Section **Hoya**

In G. Don, General System of Gardening and Botany 4 (1837) 125.

Twining, scandent, or decumbent shrubs, usually radicans. Leaves fleshy. Leaflets of the corona furrowed beneath. Type species is **Hoya carnosa** R. Br.

## VIII. Salient Features of the Hoya Sections

There have been some additions by various taxonomists to the original sectional descriptions. Now as they appear in the "accepted list" I will proceed to discuss these sections and point out the salient characters:

**Peltostemma** Schlechter. *Pelto* = a shield and *stemma* = crown. A shield crowned hoyas. This section was established to cover a small group of hoyas in which one leaf of a pair aborts or otherwise fails to develop. The leaves are circular convex on top with the

concave surface covering the stem and appressed to the substrate (usually tree trunks). Many rootlets develop from under these leaves attaching to the substrate, and often the spaces are occupied by small ants. The corona scales are very upright with long emerging anther appendages extending from the flower center, rising above the scale's inner lobe. The anther wings are prominent. The pollinia are rather long and narrow, and the translators broad and scapulate with the caudicles long and narrow as is also the retinaculum. The delineating features are thus:

1. One circular shield-like leaf per node
2. Leaves appressed to the substrate
3. Leaves tend to be imbricate
4. Coronal scales upright
5. Anther appendage very long and narrow, extended
6. Anther wings prominent
7. Styler head hollow at apex
8. Translators broad, scapulate
9. Pollinia, caudicles and retinacula long and narrow

**Otostemma** (Blume) Miquel, *oto* = ear and *stemma* = crown (The Ear Crowned Hoya). There is little dispute regarding this section since its characteristics are well delineated and up till now very few species have been discovered with the sectional characteristics. The flowers are small with revolute very pubescent corollas. **Hoya lacunosa** Blume is the type species. From the lower surface of the coronal scale project two dentate structures, but even more striking is the pentagonal skirt or annulus extending below with each corner being below the anther wing area. It is continuous (in *H. lacunosa*) except for a visible short slit at the intersecting corners. In the Borneo species the corners are rounded slightly and slightly spread like bifid tongues. Another species from Borneo sold in commerce, as *H. sp. F-484*, is somewhat intermediate but with a very distinctive pollinarium. There has been speculation recently about the 2 acute dentate structures on the ventral side of the thin coronal scales outer coronal lobe. These structures are clearly visible in my photomicrograph of *Hoya lacunosa* Blume they were drawn as two adjacent triangles in Blume's figure. The thickening of the central portion of the lower surface of the outer lobe spreads outward to form the tooth. There are species that evidently belong in this section from Borneo that do not possess these teeth. I feel this character should be removed from the sectional traits so as to include these Bornean species. It is the column that extends the gynostegium and not the skirt that surrounds it. These teeth should not be confused with the bilobed extensions in the Section *Acanthostemma* (Bl.) Kloppenburg.

1. Gynostegium elevated
2. Flowers small
3. Corolla rotate, revolute
4. Corona scales boat shaped, fleshy thin translucent on outer edges
5. Corona scales diverticulate
6. Corona scales concave above
7. Corona scales interior angle toothed, superior or equal to the

anthers

8. Corona scales below with bidentate appendage and annulus, not sulcate
9. Stigma (styler head) rudimentary, apiculate \*
10. Leaves glabrous
11. Umbels with moderately long peduncles

\* Stigma (styler head) on *H. obscura* Elmer ex Burton has a columnar base (slightly tapering upward) with a triangular mealy head.

**Kloiphora** King . *Cloe* = a collar and *phoro* = to bear. A collar bearing hoyas. Again this is a monotypic Section consisting at present of only *H. curtisii* King & Gamble, from Malaya, designated as Section at its conception. Sectional characters:

1. Corolla tube with a broad annular ring
2. Corona scales lower lobe globose
3. Corona scales lower lobe hollow
4. Corona scales upper lobe short curved

Specific characters could be added from the species, however doing so may narrow the diagnosis too greatly.

**Skenostemma** Kloppenburg. *Skene* = covered place and *stemma* = crown. The covered crown Hoya. Containing at present only one species. A branching small epiphyte with urceolate flowers on short peduncles and pedicels, almost sessile. The corolla lobes are reflexed, with the corolla 5-fid cut to above the middle. The crown is upright and with bifid outer lobes as in the Section *Sperlingia* (Vahl) Miquel (*Acanthostemma*). The pollinarium have winged translator arms. The translators are attached low down on the retinaculum. The stigma (styler head) is columnar with a nipple-like apex. Key features are:

1. Crown covered by corolla (corolla urceolate)
2. Flowers small
3. Peduncles and pedicels very short almost sessile
4. Corona upright
5. Corona scales bilobed as in *Acanthostemma*
6. Translator arms winged, attached low down on retinaculum
7. Stigma head (style) columnar apex nipple-like

**Acanthostemma** (Bl.) Kloppenburg. *Acanthus* = a thorn and *stemma* = crown. Thorny crowned hoyas. This section has small pubescent ball shaped flowers with (revolute corolla) flowers looking much like those of the Section *Otostemma*. Most have geotropic umbels which are concave or flat. The calyx is small, the gynostegium short adnate. The apex of the corolla lobes are bare and hidden in the revolute fold, difficult to discern in herbarium material. The corona is upright to very upright, with a tooth-like inner apex and blunt outer apex, the lateral sides of the scales are shelved and extended beyond and often above the outer apex as two ligule-like structures, the lower part of the scale is sulcate



recurved to form a groove. The pollinia have curved translator arms supporting clear caudicles (described as winged). The pollinia are affixed at the base and have a pellucid outer border but not all the way to the caudicles. The styler head (stigma) is apiculate. Sectional characteristics are:

1. Flowers small
2. Corolla rotate, revolute
3. Gynostegium short, adnate
4. Corona segments fleshy, erect
5. Coronal inner angle tooth-like
6. Coronal outer angle with 2 extensions
7. Stigma (styler head) apiculate
9. Flowers often many

The *Eriostemma* section has now been transferred to Genus status (*Eriostemma* Kloppenburg & Gilding) 2001.

**Eriostemma** Schlechter. *Erio* = wool and *stemma* = crown. A woolly crowned hoyas. This section is so distinctive and has so many sharp differences from other hoyas that it has been proposed to make it into a subgenus of *Hoya* (Schlechter) or even a distinct genus in its own right (Dr. Ken Hill). With this in mind the diagnostic features are as follows:

1. Stems and leaves with soft short hairs
2. Gynostegium stands on a column
3. Column covered with shaggy cotton-like hairs
4. Corolla with distinct collar
5. Large flowers
6. Thick hirsute calyx
7. Branches soft and fleshy
8. Peduncles extraordinarily thick and soft
9. Flowers hairy and fleshy
10. Pollinia club shaped with no pellucid border
11. Translator arms long, twisted
12. Retinaculum large

**Cathetostemma** (Blume) Miquel, from *cathetos* = perpendicular and *stemma* = crown. Perpendicular crowned hoyas. The drawing in Museum Botanicum Lugduno-Batavum 1 (1849) 59 tab.13 shows a very upright crown with a bifid outer apex. The pollinia are ellipsoidal and do not show the distinct pellucid margin (sterile keel). They are similar in appearance to those of Section *Eriostemma* Schlechter. It definitely does not have a long narrow pellucid edged pollinia as in Section *Centrostemma* (Bl) Hooker. Pollinia are basely attached to the retinaculum by translators, whereas those in Section *Centrostemma* are laterally attached. No species of the *Centrostemma* I have examined has this type of

pollinarium. The calyx depicted here is very small in relation to the corolla or crown. Sectional characteristics are:

1. Corolla reflexed
2. Gynostegium short
3. Corona scales sickle shaped
4. Corona scales erect, fleshy; convex
5. Corona scales at base bifid
6. Stigma (styler head) umbonate
7. Leaves glabrous, leathery
8. Umbels of many flowers
9. Peduncle short
10. Pedicels long
11. Flowers often very large (yellowish)
12. Pollinia basely attached

**Rudimentalia** Kloppenburg *rudimentum* = a beginning (transitional pollinia type, rudimentary). Glabrous leaved hoyas, sometimes dimorphic or effected by formic acid from ants, with many flowered umbels, flowers large, glabrous, shiny, corollas deeply cut, tubes short, lobes reflexed; corona leaflets erect, large triangular conic, on the lower surface deeply sulcate; pollinia compressed, short ovate, sterile pellucid margin rudimentary, almost lacking, retinaculum large broad, translators cone shaped, staminal head obconic.

1. Leaves fleshy, glabrous
2. Foliage often modified (formic acid)
3. Flowers large, many
4. Corolla deeply lobed, reflexed
5. Tube short
6. Corona erect, large
7. Corona deeply sulcate below
8. Pollinia broad, ovate
9. Sterile (pellucid) edge rudimentary
10. Retinaculum short broad, prominent
11. Styler head obconic

**Centrostemma** (Decaisne) Hooker f.. *cento* = a point and *stemma* = crown (a pointed crown) *Hoya multiflora* Blume the Type is such a distinctive species that one should have no difficulty placing species into this section. It is so distinct that some taxonomists have felt it should be a genus in its own right and thus not be incorporated into the Genus *Hoya* R. Brown. Note: J. D. Hooker in his "Flora of British India" apparently misspelled Bennett's *Cyrtoceras* *cyрто* = arched *cerae* (*cer*) = a horn (arched horn) as *Cryptoceras* while placing it as a hoya section. Sectional characteristics:

1. Corolla rotate, reflexed
2. Gynostegium with prominent beard about base
3. Gynostegium elongated
4. Corolla inner lobes overtopping gynostegium
5. Coronal scales fleshy, erect
6. Coronal scales at base horn-like or with apex tooth-like
7. Leaves glabrous, leathery
8. Peduncles short
9. Umbels, many flowered & often large on long pedicels
10. Stigma (style head) dome shaped

**Ancistrostemma** Hooker, *Ancistro* = a fish hook and *stemma* = crown. Hook-crowned hoyas. To date only one hoyas species falls into this section (*H. edeni* King). The name was created as a sectional designation and not first as a genus as with many of the other sections. Sectional characteristics are:

1. Corolla reflexed
2. Corolla lobes longer than broad
3. Column sessile
4. Corona gibbous
5. Coronal scales below 2 lamellate
6. Coronal scales inner lobe extended upward, erect
7. Corona inner lobe bifid, incurved, hooked

**Pterostelma** (Wight) Hooker. *Ptero* = winged and *stelma* = crown "winged crown" (leaflets of corona membranaceous). Both Blume in Rumphia 4 (1848) 32 and Wight's description say "corolla rotate" with no mention of the corolla being reflexed, and the same holds true for the Type description of *Hoya acuminata* Benth., however, by the time J. D. Hooker in the Flora of British India 4 (1885) 53 describes the *Pterostelma* section he adds "corolla reflexa". This is true of the section *Plocostemma* but should not be in this sectional description. ((The coronal scales (foliola) are reflexed but not the corolla)). Both the drawing of *Pterostelma albiflorum* (Rumphia tab.188) and Schlechter's drawing of *Hoya calycina* show the calyx lobes as large and in *H. calycina* also pubescent. (neither of these species have reflexed corolla). The distinguishing features are thus:

1. Corolla rotate
2. Corolla lobes longer than broad, linear-lanceolate
3. Corolla tube pilose
4. Corona scales membranaceous
5. Corona scales, sides reflexed
6. Corona subulate erect (folded in the middle like a butterfly's wings)\*
7. Corona scales broad

8. Dorsal not lateral attachment of the pollen masses to the retinaculum (corpusculum)
9. Sepals of the calyx large
10. Stigma (styler head) apiculate
11. Flowers conspicuous (large)
12. Pedicels equal
13. Coronal scales ovate
14. Caudicles (translators) unwinged
15. Mesophyll differentiated
- 16.

Note: characters 12-15 are from Dr. K.D. Hill's additional observations.

\* See Schlechter's drawing of *H. calycina* on p.65 (from the Berlin type sheet) in Hoyas of Northeastern New Guinea 1992 - ORCA Pub. Co.. This shows the folding of the corona and other details. It is clear also, as Dr. Hill stated that the *H. australis* complex belong here. In Rumphia 4 (1848) 33 Blume placed *Hoya albiflora* Herb. Zipp. as *Pterostelma* Wight; P. (*Rhytistelma*) *albiflorum*, thus in a section (non *Hoya*) *Rhytistelma*. Fig. 88 shows a hoya with rotate corolla but with no flowers showing reflexed corolla, most possibly still in the process of opening.

**Physostelma** (Wight) Blume, from *Physa* = a bladder and *stelma* = a crown (leaflets of crown inflated). This can be combined with the section *Cystidianthus* (Hasskarl) King & Gamble (1843). The umbels of few large flowers are borne on long peduncles. Under section *Cystidianthus* we find the additional key character (not mentioned in *Physostelma* Wight) "corolla somewhat campanulate" and that the corolla margins are undulate; "at first spreading then reflexed". Wight says "stigma convex and blunt". Schlechter emphasizes the "bell shaped" corolla and that 2 sections might be needed to separate the broad coronal types from those whose coronal lobes are laterally compressed. (e.g. *H. epedunculata* Schlechter from *H. campanulata* Blume). Blume's *Physostemma* also seems to belong here. He says coronal scales "sub inflated" and that the margins are revolute with a gaping longitudinal fissure (sulcation). In summary the salient features are: (W=Wight, S=Schlechter, H=Hasskarl, B=Blume, K=Hill).

- 1.W Corolla margins rotate later reflexed
- 2.W Bladder-like corona (inflated)
- 3.W Large flowers
- 4.W Few flowers
- 5.W Long peduncles
- 6.W Flattened Stigma (styler head) somewhat sunken in center
- 7.HS Bell shaped campanulate corolla
- 8.S Calyx small
- 9.S Corona small in relation to corolla
- 10.H Exterior angle of corona scales rising
- 11.B Corona with gaping longitudinal fissure below

- 12.K Pedicels equal
- 13.K Caudicles (translators) unwinged
- 14.K Mesophyll strongly differentiated

**Oreostemma** Schlechter. *Oreo* = a mountain and *stemma* = crown. A mountain crowned hoyo. A section originated by Dr. Schlechter as such and not first as a genus. Its type species is *H. oreostemma* Schlechter. Dr. Schlechter felt it might possibly fit in the *Pterostelma* section but for the very small calyx and the fact that the outer lobe of the coronal scales stand up vertically (almost columnar) and the inner ones taper off in a line almost perpendicular to the tip. Thus the sectional characteristics are:

- 1. Calyx very small
- 2. Corona scales almost columnar
- 3. Corona scales outer lobe stand up vertically
- 4. Corona scale inner lobe tapering to a thin line almost perpendicular at tip
- 5. Corona scale inner lobe ca. 1/2 as high as body
- 6. Corolla strongly reflexed

**Plocostemma** (Blume) Miquel, from *ploco* = a bladder and *stemma* = crown. Bladder-crowned Hoya. Dr. Schlechter's *H. piestolepis* and *H. hypolasia* were both placed in this Section. They seem to belong here based on the coronal scale formation and the recurved corollas. Dr. Schlechter, however, has not drawn the stigmas so we do not know if these two species have the distinctive apiculate stigmas mentioned and also depicted in Mus. Bot. Lugd.-Bat. 1:60 fig.14. (*Pl. lasianthum* Bl.). This drawing, if accurate, also depicts a very distinctive prominent attachment of the pollinia to the translators. Burton in Hoya 13 (1991) 28 states "*H. cumingiana* Decne." is a *Plocostemma*. This species does not fit the Sectional characteristics in a number of key respects. Its coronal lobes are entirely different in shape, not laterally compressed, but rather broad in the middle, and not overly upright. The corolla is not densely woolly. The translators are very small at the attachment point. Most of all, however, *H. cumingiana* Decaisne has a very distinctive ornate capitate head to the styler (stigma) head. I feel it more nearly belongs in Section *Cathetostemma* (Bl.) Miquel. The Sectional characteristics:

- 1. Corolla densely woolly esp. near base
- 2. Corolla spread or reflexed
- 3. Corona upright
- 4. Coronal scales fleshy, inner apex tooth-like
- 5. Coronal scales laterally compressed
- 6. Gynostegia adnate, somewhat sessile
- 7. Coronal scales below folded upon self
- 8. Calyx small
- 9. Many flowered
- 10. Stigma apiculate

**Amblyostemma** Kloppenburg from *amblyo* = blunt and *stelma* = crown. The blunt crowned hoya.

Very vigorous growth, large glabrous foliage with revolute edges to the leaves. Short glabrous peduncles and pedicels. Flowers medium large, many per umbel. Corolla glabrous outside densely puberulous inside with revolute lobes. Crown with short blunt outer apices, scales above concave with an umbo; exuding a colored honeydew which stains the pubescence of the corolla. Staminal column very short, staminal head apiculate.

Sectional characteristics:

1. Large glabrous foliage
2. Leaf edges revolute
3. Flower size medium large
4. Many flowers per umbel
5. Corolla revolute, inside densely pubescent
6. Outer corona lobes blunt
7. Scales above concave with umbo
8. Exuding a colored honeydew
9. Style head apiculate

**Hoya:** the original descriptions are very brief, so with few clear characteristics, the section has become the "dumping ground" for many hoyo species. Further sections should be added to more clearly distinguish those species in this "dumping ground". Sectional characteristics:

1. Leaves fleshy
2. Corona furrowed below (sulcate or channeled)
3. Staminal corona approximating horizontal
4. Flowers large
5. Corona scales flat above or slightly cupped
6. Corona scales, outer end acute
7. Calyx small
8. Pedicels equal
9. Corona with slight median ridge
10. Caudicles (translators) unwinged
11. Mesophyll weakly differentiated or undifferentiated.

Note: characters 9-11 are from Dr. K.D. Hill's additional characters. I have added 3-7.

## **IX. Some Representative Species From Each Section**

Section **Peltostemma** Schlechter:

*H. imbricata* Decaisne  
*H. maxima* (Karsten) Koorders  
*H. pseudomaxima* Koorders

Section **Otostemma** (Blume) Miquel

*H. lacunosa* Blume  
*H. obscura* Elmer ex Burton  
*H. brittonii* Kloppenburg

Section **Skenostemma** Kloppenburg

*H. heuschkeliana* Klopp.

Section **Kloiphora** King

*H. curtisii* King

Section **Acanthostemma** (Blume) Kloppenburg

<i>H. bilobata</i> Schlechter	<i>H. micrantha</i> Hooker f.
<i>H. burtoniae</i> Kloppenburg	<i>H. microstemma</i> Schlechter
<i>H. gracilis</i> Schlechter	<i>H. panchoi</i> Kloppenburg
<i>H. gigantanganensis</i> Kloppenburg	<i>H. picta</i> Miquel
<i>H. hasseltii</i> Miquel	<i>H. plicata</i> King & Gamble
<i>H. inconspicua</i> Hemsley	<i>H. pruinosa</i> Miquel
<i>H. kuhlii</i> Koorders	<i>H. pubera</i> Blume
<i>H. leytenis</i> Elmer ex Burton	<i>H. quisumbingii</i> Kloppenburg
<i>H. littoralis</i> Schlechter	<i>H. revoluta</i> Wight
<i>H. loheri</i> Kloppenburg	<i>H. rizaliana</i> Kloppenburg
<i>H. tsangii</i> Burton ex Kloppenburg	<i>H. rumphii</i> Blume
<i>H. flavida</i> Forster & Liddle	

Section **Eriostemma** Schlechter Now *Eriostemma* species,

<i>H. coronaria</i> Blume	<i>H. guppyi</i> Oliver
<i>H. ariadna</i> Decaisne	<i>H. affinis</i> Hemsley
<i>H. madulidii</i> Kloppenburg	<i>H. hollrungii</i> Warburg
<i>H. ciliata</i> Elmer ex Burton	<i>H. gigas</i> Schlechter
<i>H. purpurea</i> Blume	<i>H. lauterbachii</i> K. Schumann
<i>H. neoguineensis</i> Engler	<i>H. sussuela</i> (Rox.) Merr.
<i>H. subcalva</i> Burkill	

Section **Cathetostemma** (Blume) Miquel

*H. laurifolia* Decaisne

Section **Rudimantalia** Kloppenburg

*H. darwinii* Loher  
*H. mitrata* Kerr

Section **Centrostemma** (Blume) Miquel

*H. multiflora* Blume  
*H. laurifolia* Blume ?  
*H. platipetala* Merrill ?

Section **Ancistrostemma** Hooker f.

*H. edeni* King

Section **Pterostelma** (Wight) Hooker f.

*H. acuminata* Wight non Hooker  
*H. albiflora* Zipp. ex Blume  
*H. calycina* Schlechter  
*H. australis* R. Brown ex Trail  
*H. magnifica* Forster & Liddle

*H. sana* Bailey  
*H. rupicola* Hill  
*H. oligotricha* Hill  
*H. bicarinata* A. Gray

Section **Physostelma** (Wight) Blume

*H. collettii* Schlechter  
*H. campanulata* Decaisne  
*H. cystiantha* Schlechter  
*H. betchei* Schlechter  
*H. patella* Schlechter  
*H. megalaster* Warburg  
*H. microphylla* Schlechter  
*H. venusta* Schlechter  
*H. pulchella* Schlechter

*H. stenophylla* Schlechter  
*H. oligantha* Schlechter  
*H. papuana* Schlechter  
*H. oleoides* Schlechter  
*H. torricellensis* Schlechter  
*H. epedunculata* Schlechter  
*H. rhodostemma* Schlechter  
*H. macgillivrayi* Bailey

Section **Oreostemma** Schlechter

*H. oreostemma* Schlechter  
*H. poolei* White & Francis  
*H. alata* Hill

Section **Plocostemma** (Blume) Miquel

*H. lasiantha* Korthals  
*H. blumeana* Schlechter (*P. pallidum* Blume)  
*H. piestolepis* Schlechter  
*H. hypolasia* Schlechter

Section **Amblyostemma** Kloppenburg

*H. meliflua* (Blanco) Merrill  
*H. diversifolia* Blume



H. kerrii Craib  
H. obovata Decaisne  
H. excavata Teijsm. & Binn.

Section **Hoya**

H. carnosae R. Brown  
H. pubicalyx Merrill

**X. A chronology as to the Sectional Uses by Different Authors follows:**

- |      |  |                                    |
|------|--|------------------------------------|
| 1837 | General System of Gardening and Botany 4 s.23 (A) G. Don |                                    |
|      | 1. Hoya verae  | p.125 with description             |
|      | 2. not designated  | p.127 with description             |
| 1838 | Genera Plantarum (1836-1844) pub. 1841 Endlicher         |                                    |
|      | 1. Hoyae verae   | p.596 with description H. carnosae |
|      | 2. Wattahaka *   | p.596 with description             |
| 1844 | DeCandolle, Prodrum Syst. Veg. 8 Decaisne                |                                    |
|      | 1. Hoyae verae   | p.634 with description             |
|      | 2. not designated  | p.639 with description             |
|      | 3. Wattahaka   | p.639 with description             |
| 1848 | Rumphia 4 C.L. Blume                                     |                                    |
|      | 1. Hoyae verae   | p.30 Hoyae carnosae, described     |
|      | 2. Physostemma   | p.32 * described                   |
| 1849 | Museum Botanicum Lugduno-Batavum 1 C.L. Blume            |                                    |
|      | 1. Hoyae verae   | p.43 no description                |
|      | 2. Physostemma   | p.44 no description                |
| 1857 | Flora von Nederlandsch Indië 1 Miquel                    |                                    |
|      | 1. Euhoya  | p.516 with description             |
|      | 2. Physostemma Bl.                                       | p.521 with description             |
|      | 3. Sperlengia Vahl                                       | p.523 (Acanthostemma Bl.),         |
|      | described  |                                    |
|      | 4. Otostemma   | p.525 with description             |
|      | 5. Cathetostemma   | p.525 with description             |
|      | 6. Plocostemma   | p.526 with description             |
| 1885 | Flora of British India 4 J. D. Hooker                    |                                    |
|      | 1. Cryptoceras   | p.52 described                     |
|      | 2. Pterostelma   | p.53 described                     |
|      | 3. Ancistrostemma  | p.53 described                     |

- |  |    |        |                |
|--|----|--------|----------------|
|  | 4. | Euhoya | p.53 described |
|--|----|--------|----------------|
- 1895 De Naturl. Pflanzenfamlein 4 (Engler's) K. Schumann
- |  |    |                |                 |
|--|----|----------------|-----------------|
|  | 1. | Cyrtoceras     | p.289 described |
|  | 2. | Ancistrostemma | p.289 described |
|  | 3. | Pterostemma    | p.289 described |
|  | 4. | Euhoya         | p.289 described |
- \*Now considered *Dregia* Meyer nom. cons. or by some *Wattakaka* Hassk. by others.
- 1901 Flora of the Malay Peninsula 2 King & Gamble
- |  |    |               |                 |
|--|----|---------------|-----------------|
|  | 1. | Cyrtoceras    | p.559 described |
|  | 2. | Pterostelma   | p.559 described |
|  | 3. | Kloiphora     | p.559 described |
|  | 4. | Euhoya        | p.559 described |
|  | 5. | Cystidianthus | p.561 described |
- 1912 Exkursions Flora von Java 3 S.H. Koorders
- |  |    |                |                          |
|--|----|----------------|--------------------------|
|  | 1. | Cyrtoceras     | p.96 described in key    |
|  | 2. | Euhoya         | p.97 described in key    |
|  | 3. | Acanthostemma  | p.98 subsection in key * |
|  | 4. | Ancistrostemma | p.100 described in key   |
- \* Koorders lists this as a untersection (subsection) designated by Miquel in Fl. Ned. Ind., however, Miquel has only placed this in a section (#3) into synonymy with Sperlingia, and not as a subsection. In addition Koorders quotes this on p.525, however, it is on p.523.
- 1913 Botanische Jahrbücher 50 R. Schlechter
- |  |    |             |                 |
|--|----|-------------|-----------------|
|  | 1. | Otostemma   | p.105 described |
|  | 2. | Euhoya      | p.105 described |
|  | 3. | Plocostemma | p.105 described |
|  | 4. | Pterostelma | p.105 described |
|  | 5. | Oreostemma  | p.105 described |
|  | 6. | Physostelma | p.105 described |
|  | 7. | Eriostemma  | p.106 described |
- 1988 Telopea 3 (2) K. Hill
- |  |    |             |                 |
|--|----|-------------|-----------------|
|  | 1. | Hoya        | p.244 described |
|  | 2. | Physostelma | p.224 described |
|  | 3. | Otostemma   | p.246 described |
|  | 4. | Pterostemma | p.246 described |
- 1994 Hoya Section Acanthostemma (Blume) Kloppenburg (1994)
- |  |    |               |               |
|--|----|---------------|---------------|
|  | 1. | Acanthostemma | p.2 described |
|--|----|---------------|---------------|

## Appendix:

Article 22.1 The name of any subdivision of a genus that includes the type of the adopted, legitimate name of the genus to which it is assigned is to repeat that generic name unaltered as its epithet, but not followed by the authors name (see Art.46). Such names are termed autonyms (Art.6.8; Art.7.2) and must include the type of the adopted name of the genus (i.e. *H. carnosae* R. Br.). Dr. Blume in *Rumphia* 4 (1848), 30 in conjunction with Section 1. *Hoyae verae* used *Hoyae carnosae* (*Hoya carnosae* R. Br.). **The section becomes *Hoya*** (repeating the generic name unaltered) and becomes an "autonym".

Article 32.6 Autonyms (Art.6.8) are accepted as validly published names, dating from the publication in which they were established (see Art.19.4, 22.2, 26.2) whether or not they appear in print in that publication.

Note Article 6.8 Autonyms are such names as can be established automatically under Art.19.4, 22.2 and 22.6, whether they were formally created or not. (Section *Hoya* was not automatically created).

Article 22.2 The first valid publication of a name of a subdivision of a genus that does not include the type of the adopted, legitimate name of the genus automatically establishes the corresponding autonym.

## XI. Chronology of Genera Use

**Note:** Below I have selected the uses of the Generic names, most of which have been incorporated into Genus *Hoya* R. Br. as sections. I do this only to show the sequence of events leading to the formation of the *Hoya* Sections. Chronologically they are as follows:

- 1810 *Skrivter af Naturhistorie-Gelskabet*. 6:113-114 Vahl  
1. *Sperlingia*
- 1834 *Contributions to the Botany of India* Robert Wight  
1. *Physostelma* Wight p.39  
2. *Pterostelma* Wight p.39
- 1837 *General System of Gardening and Botany* V.4 s.23 (A) G. Don  
1. *Hoya* R. Brown p.125  
2. *Physostelma* Wight p.128  
3. *Pterostelma* Wight p.128
- 1838 *Genera Plantarum* Endlicher  
1. *Hoya* R. Brown p.595  
2. *Pterostemma* Wight p.596

- |      |   |                          |         |
|------|---|--------------------------|---------|
|      | 3.  | Physostelma Wight        | p.596   |
| 1843 | Tijdschrift von Natur. Geschieden V.10 Hoev. & De Vriesse |                          |         |
|      | 1.  | Cystidianthus Hasskarl   | p.125   |
| 1844 | DeCandolle, Prodromus Syst. Veg. V.8 Decaisne             |                          |         |
|      | 1.  | Plocostemma Blume        | p.630   |
|      | 2.  | Physostelma Wight        | p.633   |
|      | 3.  | Pterostelma Wight        | p.633   |
|      | 4.  | Centrostemma Decne.      | p.634   |
|      | 5.  | Hoya R. Br.              | p.634   |
| 1848 | Rumphia V.4 C.L. Blume                                    |                          |         |
|      | 1.  | Acanthostemma Blume      | p.29    |
|      | 2.  | Otostemma Blume          | p.30    |
|      | 3.  | Cathetostemma Blume      | p.30    |
|      | 4.  | Pterostelma Wight        | p.32    |
| 1849 | Museum Botanicum Lugduno-Batavum V.1 C.L. Blume           |                          |         |
|      | 1.  | Hoya R. Brown            | p.43    |
|      | 2.  | Centrostemma Decaisne    | p.57    |
|      | 3.  | Cathetostemma Blume      | p.45    |
|      | 4.  | Cystidianthus Hassk.     | p.57    |
|      | 5.  | Plocostemma Blume        | p.59    |
| 1852 | Annales Botanices Systematicae V.3 G.C. Walpers           |                          |         |
|      | 1.  | Acanthostemma Blume      | p.64    |
|      | 2.  | Cathetostemma Blume      | p.64-65 |
|      | 3.  | Otostemma Blume          | p.65    |
|      | 4.  | Hoya R. Brown            | p.65    |
|      | 5.  | Plocostemma Blume        | p.67    |
| 1857 | Flora van Indiaë V.2 F.A.W. Miquel                        |                          |         |
|      | 1.  | Cystidianthus Hassk.     | p.515   |
|      | 2.  | Hoya R. Brown            | p.516   |
| 1858 | Botanical Magazine, Curtis's                              |                          |         |
|      | 1.  | Plocostemma Blume t.5081 |         |
| 1858 | Annales Botanices Systematicae V.5 C.G. Walpers           |                          |         |
|      | 1.  | Physostelma Wight        | p.505   |
|      | 2.  | Hoya R. Brown            | p.505   |
| 1860 | Botanical Magazine, Curtis's                              |                          |         |

1.        *Centrostemma* Decaisne t.5173
- 
- 1876    *Genera Plantarum* V.2 Bentham & Hooker
1.        *Acanthostemma* Blume        p.772
  2.        *Otostemma* Blume        p.772
  3.        *Cathetostemma* Blume        p.772
  4.        *Plocostemma* Blume        p.772
  5.        *Cyrtoceras* Bennett        p.772
  6.        *Centrostemma* Decaisne        p.772
  7.        *Pterostelma* Wight        p.772
  8.        *Physostelma* Wight        p.772
- 
- 1885    *Flora of British India* V.4 J. D. Hooker
1.        *Hoya* R. Brown        p.52
  2.        *Physostelma* Wight        p.62
- 
- 1895    *De Naturl. Pflanzentfamilien* V.4 (Engler's) K. Schumann
1.        *Physostelma* Wight        p.289
  2.        *Truetleria* Hooker        p.289
  3.        *Hoya* R. Brown (*Sperlingia* Vahl) p.289
- 
- 1910    *Systematisches Verzeichnis Java* Koorders
1.        *Physostelma* Wight        p.5
  2.        *Hoya* R. Br.        p.5
- 
- 1912    *Exkursionsflora, Flora Java* V.3 S.H. Koorders
1.        *Physostelma* Wight        p.96
  2.        *Hoya* R. Br.        p.96
- 
- 1965    *Flora of Java* V.2 Backer
1.        *Physostelma* Wight        p.265

\* It should be noted that Blume in *Rumphia* 4 (1844) originally retained the spelling of *Pterostelma* but changed *Physostelma* when designating it as a *Hoya* Section to "*Physostemma*" p.32.

## **XII. *Hoya* R. Brown: Chronology of literature references**

The following publications, here arranged in chronological order, carry descriptions of *Hoya*.

- 1809    R. Brown *Mem. Wern. Nat. Hist. Society* 1:26-27

- 1810 R. Brown Prodrum "Florae Novae Hollandiae" 459
- 1811 W. Aiton Hortus Kewensis ed. alt. 2 :84
- 1826 C. Blume Bijlagen tot de Flora van Nederlandsch Indië (Bijdr. 1825)1062
- 1834 R. Wight Contributions to the Botany of India 29
- 1837 Curtis's Botanical Magazine t.3425
- 1837 G. Don General System of Gardening and Botany 4 s.23 (A),125
- 1838 S. Endlicher Gen. Pl. 3501 3:177, pl.270 & 595-596
- 1839 Lindley in Edwards' Botanical Register 18
- 1844 Decaisne in DeCandolle Prodrum Syst. Veg. 8:634
- 1845 M. Blanco Flora de Filipinas ed.2,142
- 1848 Curtis's Botanical Magazine t.4347, 4397
- 1848 C. Blume Rumphia 4 :29
- 1848 Fleur des Serres Ser. I. 4:310, 393, 399; 6: 579
- 1849 Paxton's Magazine 15:243
- 1849 C. Blume Museum Botanicum Lugduno-Batavum 1:43
- 1850 Fleur des Series 6:143; 8:12
- 1857 Miquel Flora van Nederlandsch Indië. 1:516
- 1858 Curtis's Botanical Magazine t.5081, 5148
- 1860 Curtis's Botanical Magazine t.5173
- 1869 G. Bentham Flora Australiensis 4:324
- 1876 Bentham & Hooker Genera Plantarum 2:775-6
- 1882 C. Lauerksen Handbook der Systematic Botany 1066
- 1883 Hooker f. Flora of British India 4:52
- 1883 F. M. Bailey Synopsis of the Queensland Flora 319
- 1891 O. Kurtz Revisio Genera Plantarum pt. 2
- 1895 K. Schumann in Engler De Naturl. Pflanzenfamilien 4:288-289
- 1895 H. Trimen Handbook of the Flora of Ceylon 2 pt.3:162
- 1900 F. M. Bailey Queensland Flora pt.3:1012
- 1901 K. Schumann & K. Lauterbach Die Flora der Deutschen  
Schutzgebiete in der Südsee 512
- 1901 G. King & J. S. Gamble Flora of the Malay Peninsula 2:559
- 1905 K. Schumann & K. Lauterbach Nachtrag zur Flora der Deutschen  
Schutzgebiete in der Südsee 351
- 1912 S. H. Koorders Exkursionsflora, Flora von Java 3:96
- 1912 J. Costantine in LeConte Flore Generale des Indo Chine 4:125
- 1912 E. D. Merrill A Flora of Manila 380
- 1913 R. Schlechter Botanische Jahrbücher 50:104 "Die Asclepiadaceen von  
Deutsch Neu Guinea"
- 1918 S. H. Koorders Flora von Tjibodas 64
- 1920 P. F. Fyson Flora of the Nilgiri & Pulney Hill-Tops 3:283
- 1922 H. H. Haines Botany of Bihar & Orissa 560-561
- 1923 H. Ridley Flora of the Malay Peninsula 2:369-394
- 1923 J. S. Gamble Flora of the Presidency of Madras 2:848
- 1927 H. E. Osmaston A Forest Flora for Kumaon 356

- 1927 K. Heyne De Nuttige Planten van Nederlandsch Indie 2:1296-1297  
 1936 W. Tsiang Sunyatsenia 3:171  
 1939 E. D. Merrill Sunyatsenia 4:124  
 1950 R. Bakhuizen van der Brink & C. A. Backer & Van Stennis Blumea 6  
       "Notes on the Flora of Java" 1:378  
 1960 Pahan-Hoang Ho Flora du Vietnam 436  
 1965 C. A. Backer Flora of Java 2:266  
 1965 J. Ohwi Flora of Japan 751  
 1967 J. Ohwi Flora of Japan 216,  
 1973 H. Huber A Revised Handbook of the Flora of Ceylon 1:50  
 1974 M. R. Henderson Malayan Wildflowers 229 (reprint ed.)  
 1976 C. Salanha & D. Nicholson Flora of Hassan District Karantaka India 449  
 1978 R. E. Rintz Mayan Nature Jour. "The Peninsular Malaysian Species of Hoya"  
       3:467  
 1978 Lu Fu Yuan Flora of Taiwan 4:226; 6:238  
 1983 S. J. Ali Flora of Pakistan 150:1  
 1981 H. Huber in Dassanayake & Fosberg A Revised Handbook of The Flora of Ceylon  
       110  
 1988 K. D. Hill Telopea "A Revision of Hoya in Australia" 3:241-244  
 1990 P. I. Forster & D. L. Liddle Hoya R. Br. in Australia, An Alternative Classification  
       Austrobaileya 3:217-218

Footnotes:

<sup>1</sup> The Greek prefix 'Eu-' (= true) added with or without a hyphen, to the generic name, forms a word which earlier botanists used to indicate the same thing as G. Don intended with his "hoyae vera" i.e. the true, or original, Hoyas. This implies that the original type species and its closest relatives were members of the group so named. (in practice this did not always prove to be the case). Under the current ICBN nomenclature rules such names are illegitimate, and usually prove to be synonymous with the taxon which includes the type species of the genus and which bear, as its name, the generic name itself plus the indication of rank (viz., Section Hoya) without indication of separate authorship so as not to confuse it with the Genus.

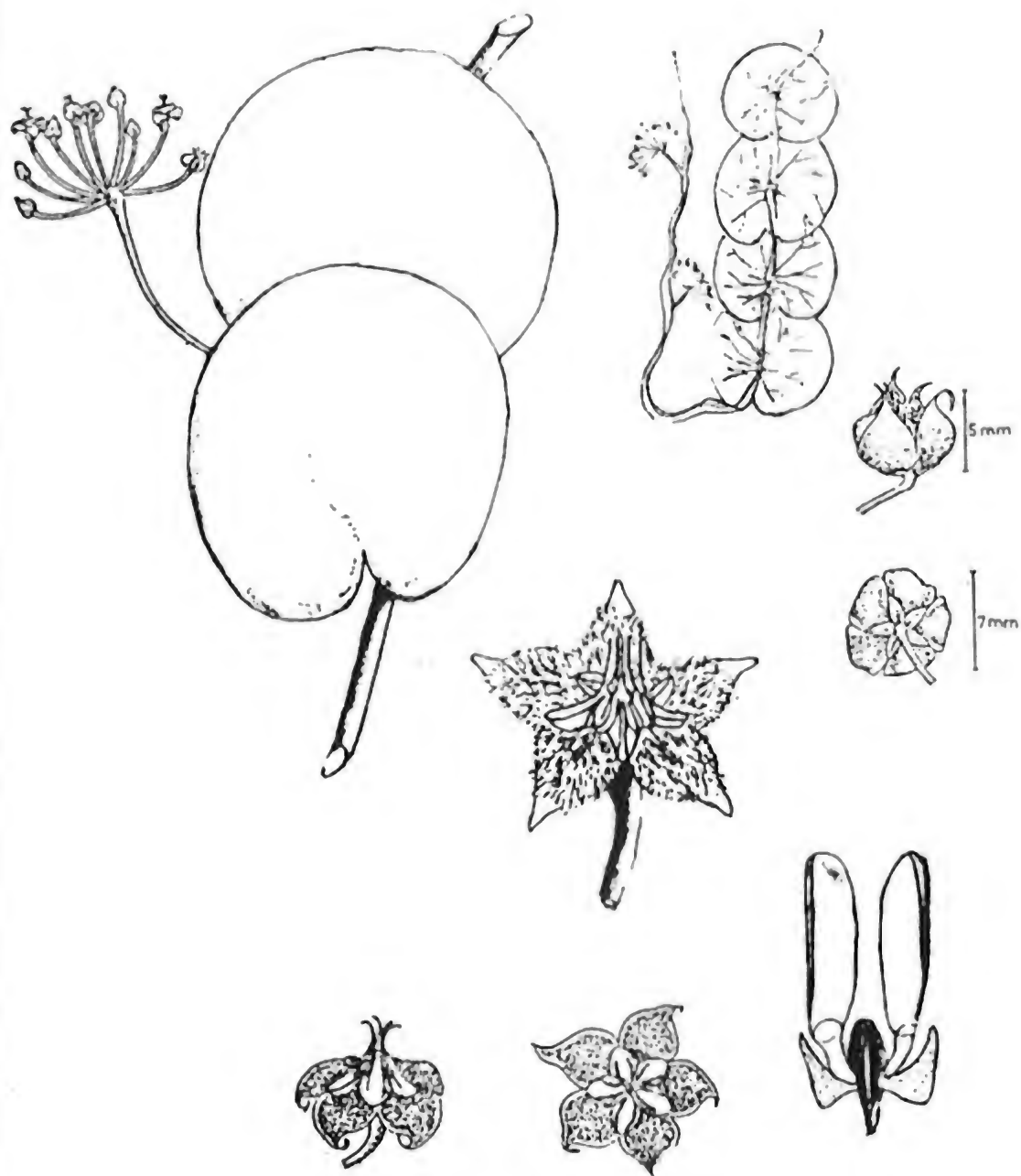
<sup>2</sup> There is, it appears no Article in ICBN to cover the changing of the spelling of a genus name lowered to a section as Blume has done with the section "Physostemma". It appears, however, that precedence would dictate that the original spelling be applied.

## Part II

# Sectional Drawings



Section Peltostemma Schlechter



*Hoya imbricata* Decaisne

Section Otostemma (Blume) Miquel

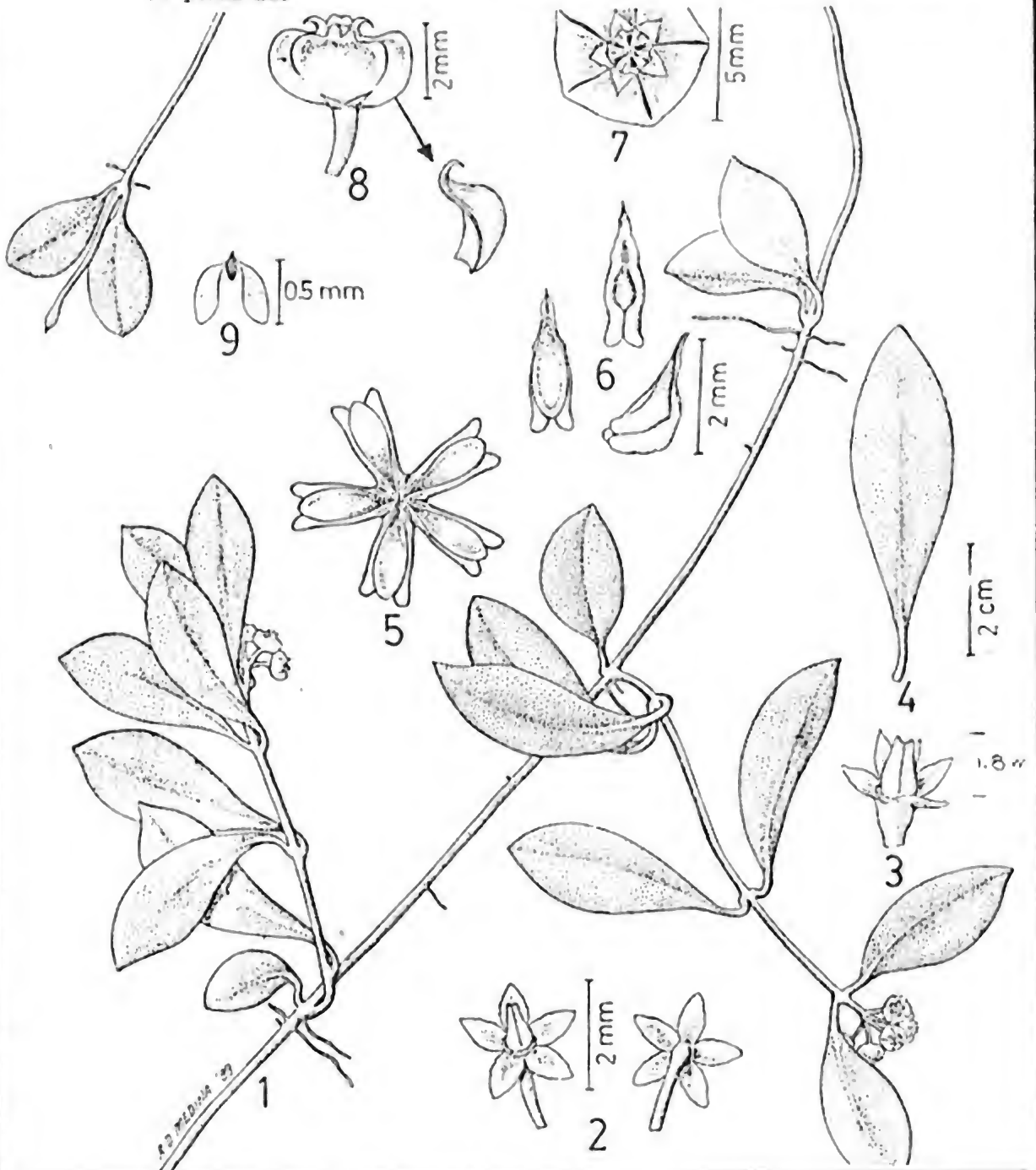


*Hoya lacunosa* Blume Bottom view of crown

Section Skenostemma Kloppenburg

*Hoya heuschkeliana* Kloppenburg

1. Flowering stem; 2 & 3. sepals, 3 views; 4. leaf; 5. corona, enlarged; 6. corona scales, 3 views; 7. flower, front view; 8. same, side view; 9. pollinia.

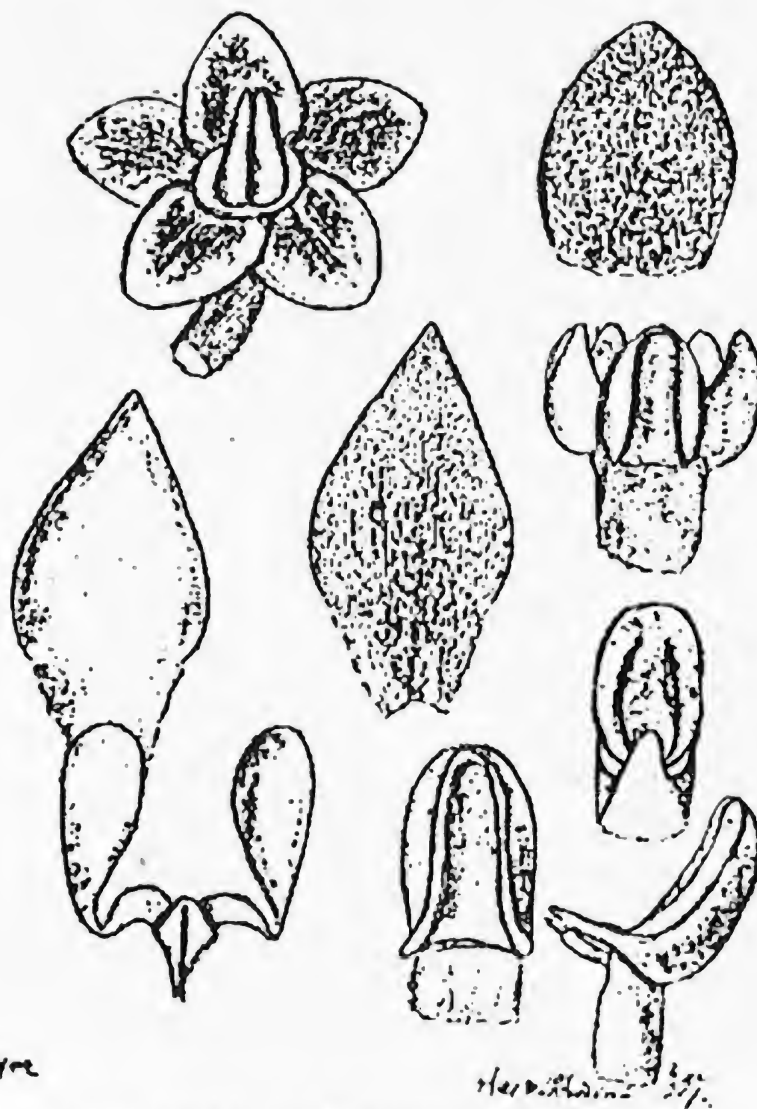


Section Kloiphora King



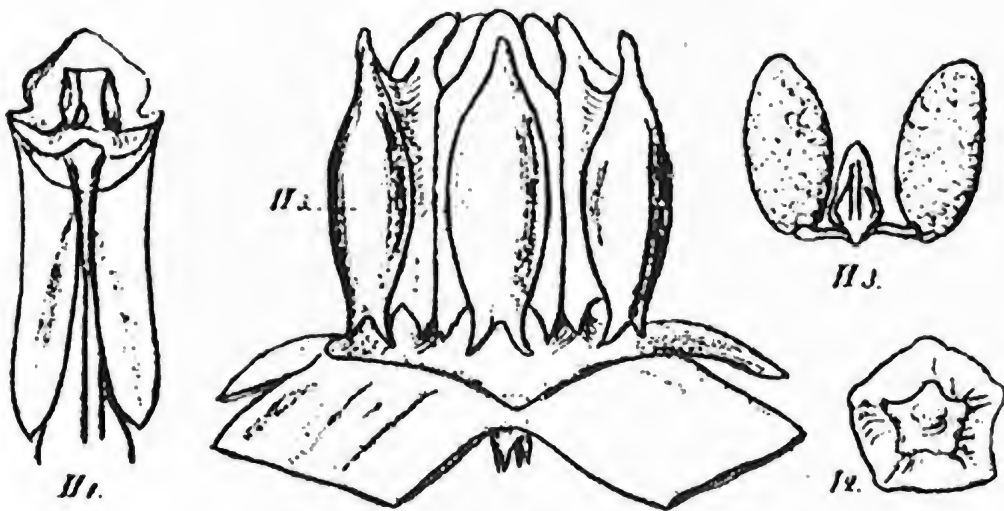
*Hoya curtisii* K. & G.

Section Eriostemma Schlechter  
 Genus Eriostemma Klopp. + Gilding  
 2001



Hoya madulidii Kloppenburg from Schlechter's Herb. sheet

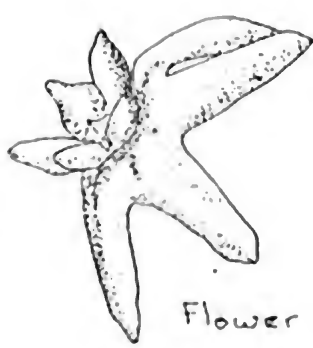
Section Cathetostemma (Blume) Miquel



*Cathetostemma laurifolium* Bl.

from Blume "Mus. Bot. L-B V.1 p.60 t.14

Section Rudimentalia Kloppenburg



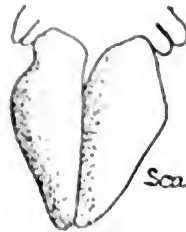
Flower



Calyx + ovary



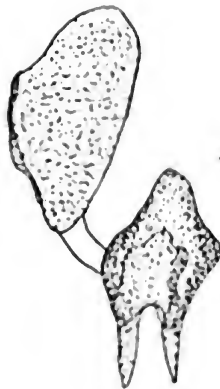
Scale Top



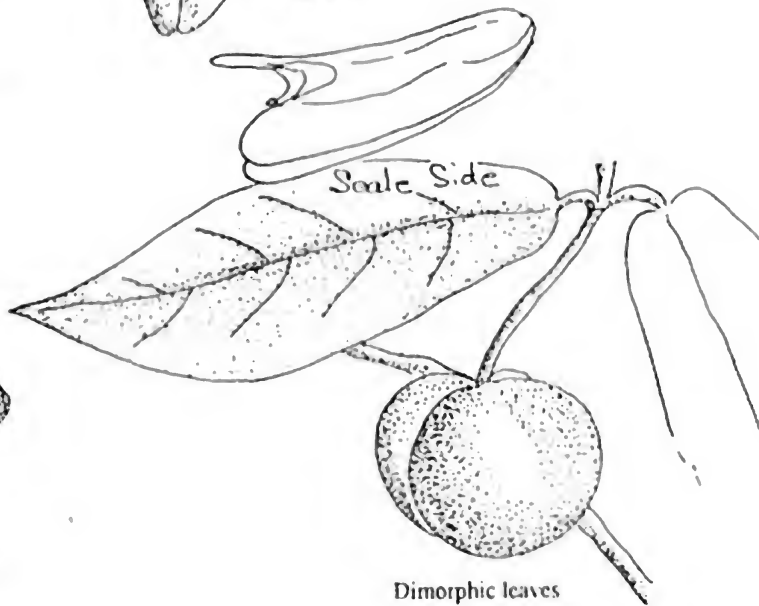
Scale Bottom



Collar



Pollinarium

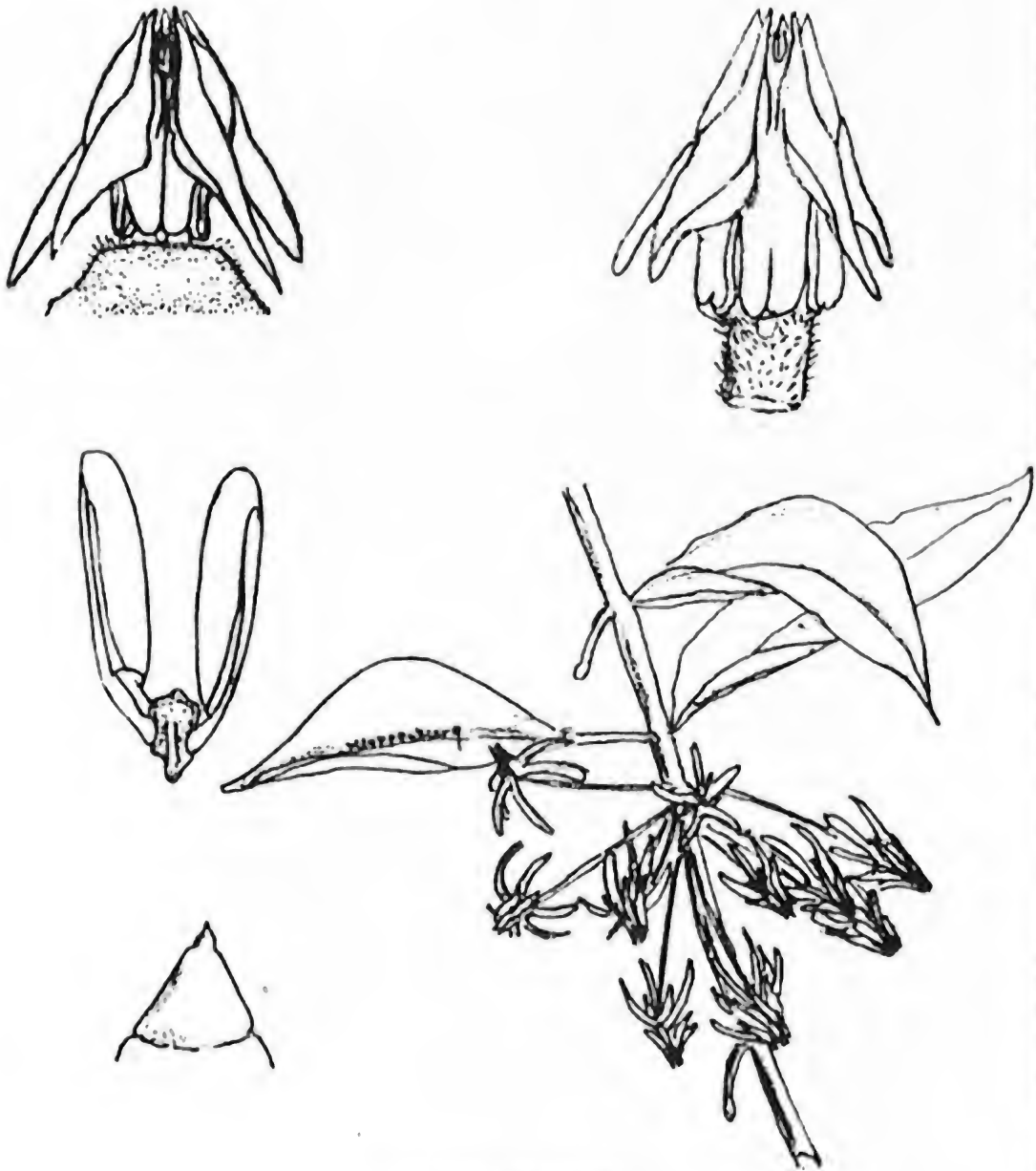


Scale Side

Dimorphic leaves

*Hoya darwinii* Loher

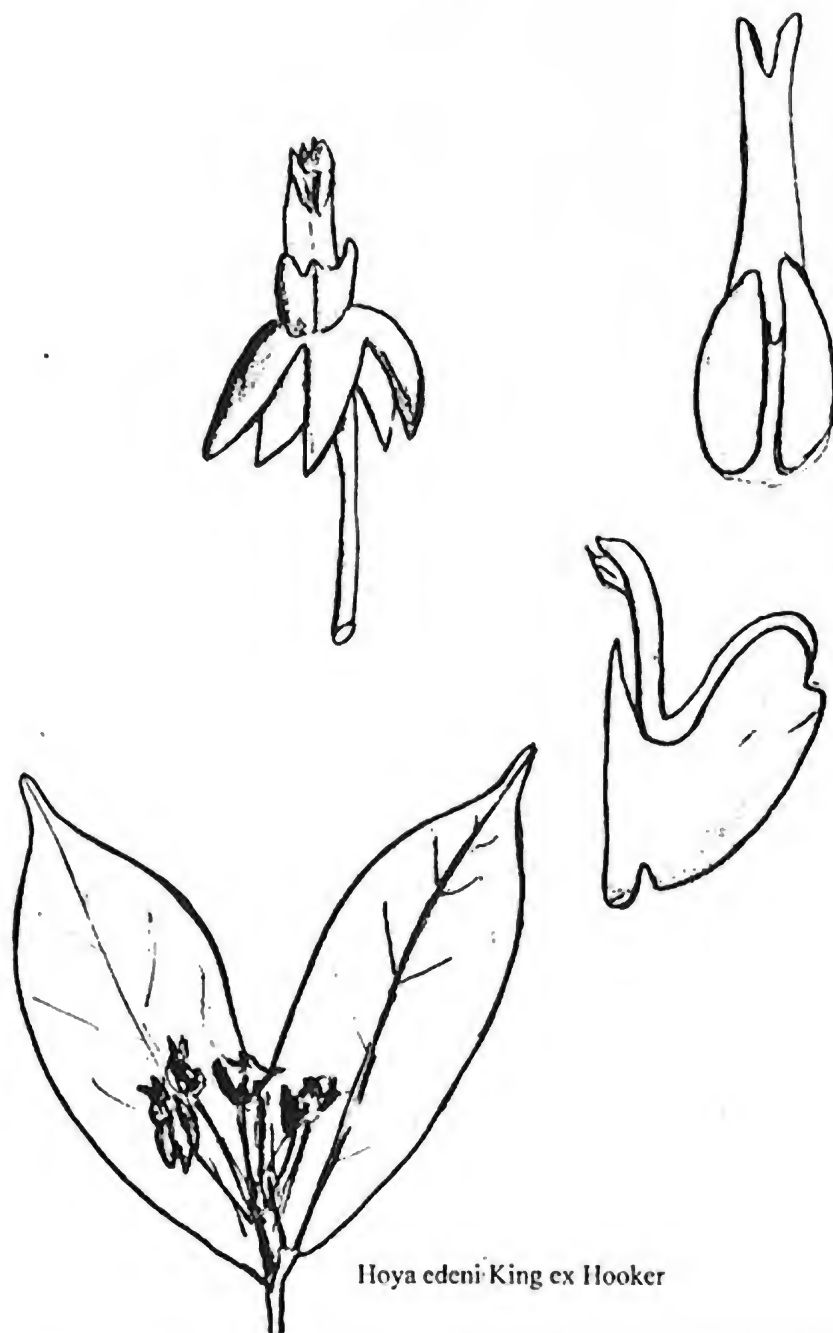
Section *Centrostemma* (Blume) Hooker



*Hoya multiflora* Blume

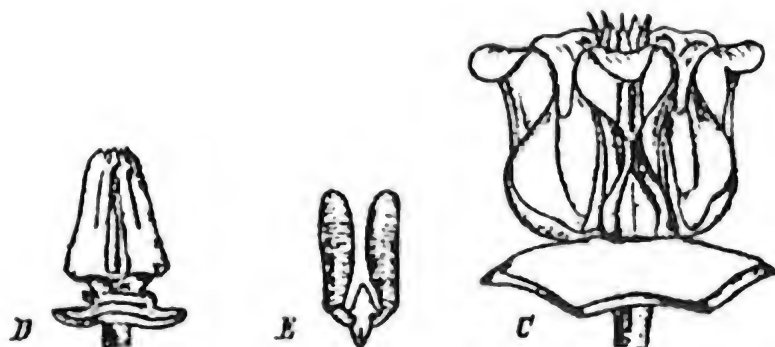


Section Ancistrostemma Hooker



*Hoya edeni* King ex Hooker

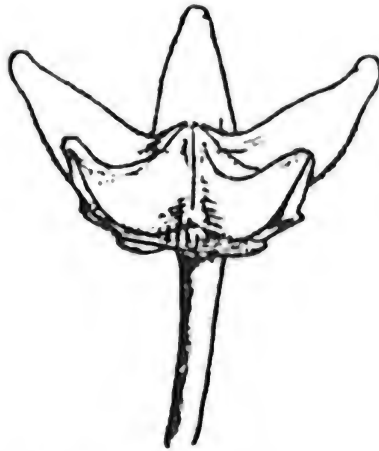
Section Pterostelma (Wight) Hooker



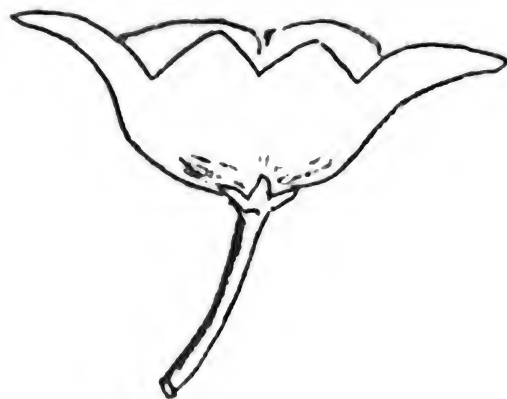
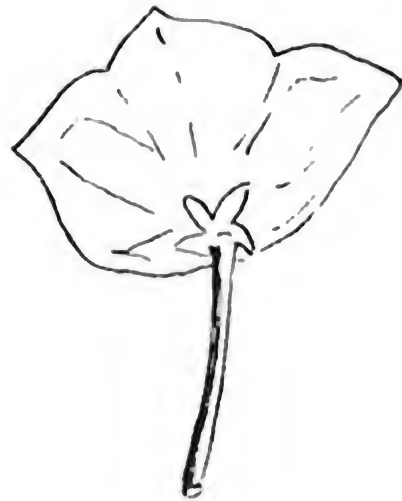
A Tracht; B Bl. — C—E *H. albiflora* Zipp. C Gynoecium; Corona; E Pollinia. (Nach Blume, Bumphia.)

*Hoya albiflora* Zipp. Engler & Prantl.

Section Physostelma (R. Wight) Blume

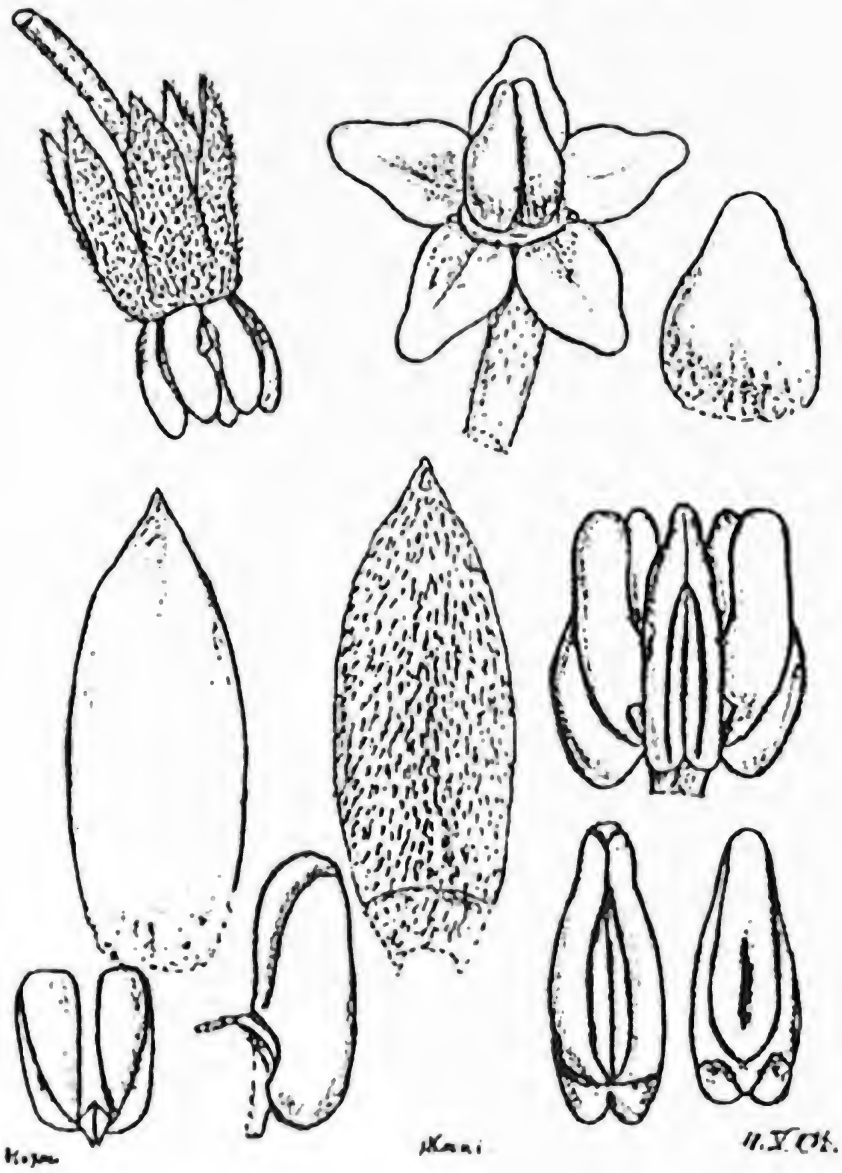


*Hoya campanulata* Blume

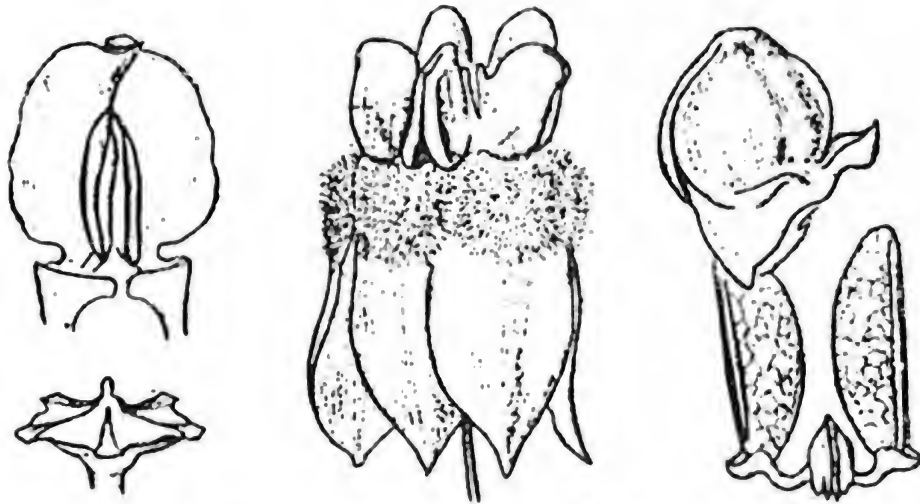


Section Oreostemma Schlechter

*Hoya oreostemma* Schlechter from Bot. Jahr. V 50



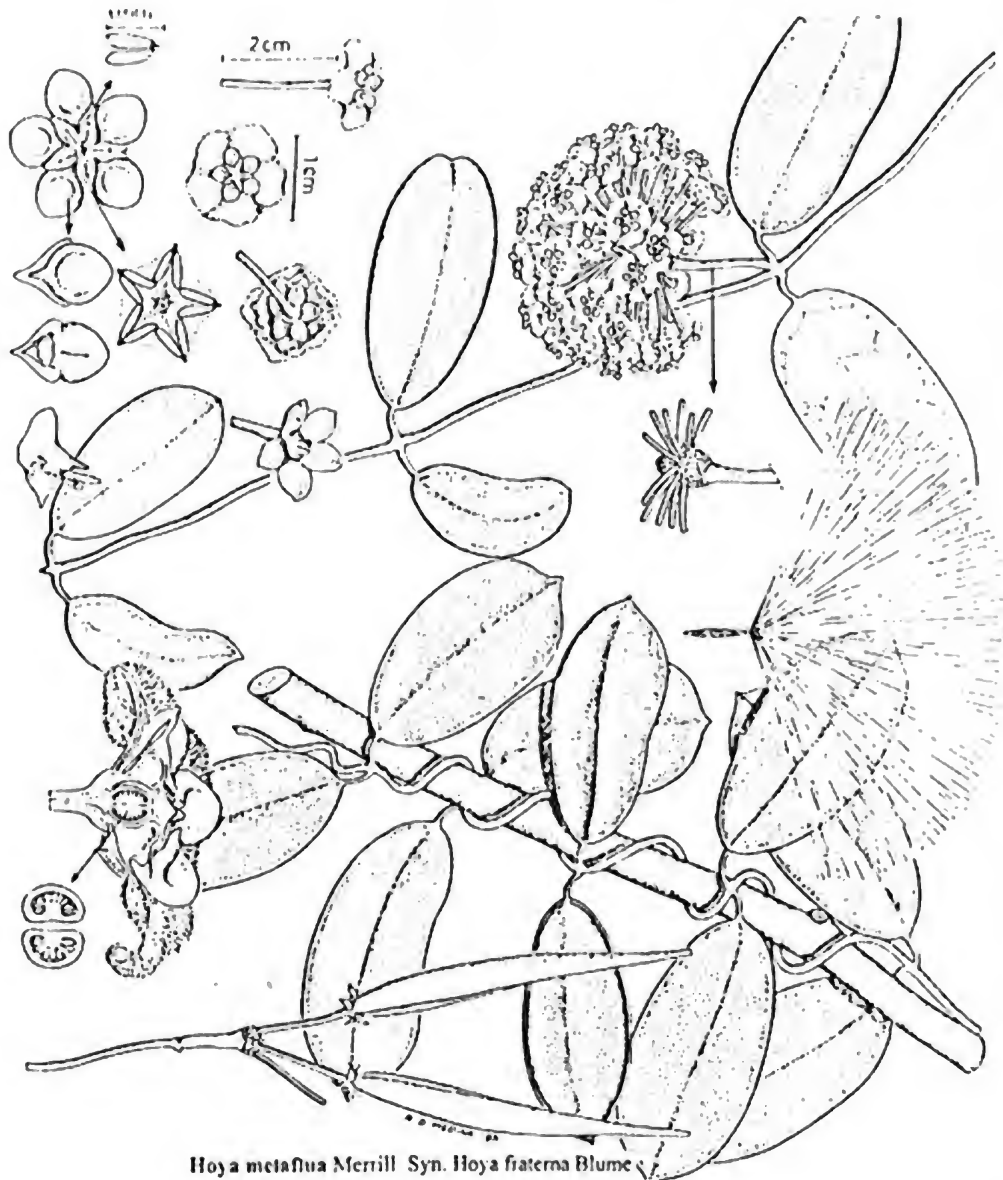
Section *Plocostemma* (Blume) Miquel



*Plocostemma lasianthum* Bl.

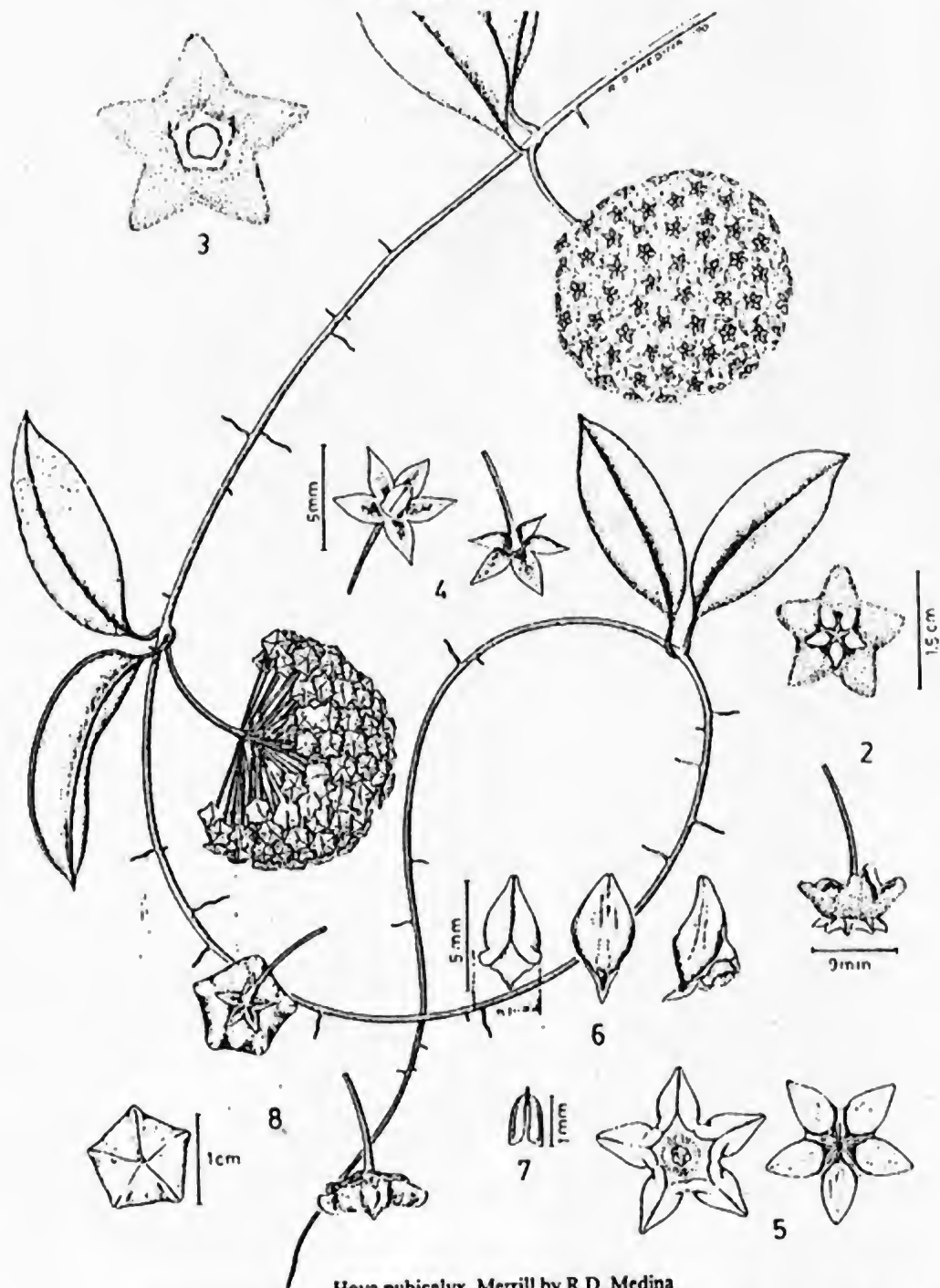
from Blume "Mus. Biot. L-B V.1 p.59 t.13

Section Amblyostemma Kloppenburg



*Hoya metaflua* Merrill Syn. *Hoya fraterna* Blume

Section Hoya



*Hoya pubicalyx* Merrill by R.D. Medina

*Hoya pubicalyx*: 1. Flowering stem; 2. flower, front view & side view; 3. petals; 4. sepals, front & back view; 5. corona, front & back views; 6. corona scales, 3 views; 7. pollinia; 8. young flower, 3 views.

### XIII Appendix

#### Recent changes

#### Genus *Eriostemma* (Schlechter) Kloppenburg & Gilding

*Eriostemma* (Schlechter) Kloppenburg & Gilding genus nova. Type; *Eriostemma coronaria*, (species *Hoya coronaria* Blume), in Bijdagen tot de Flora Nederlandsch Indie (Bijdr. 1825) 1063. Type description: C. L. Blume. *Hoya coronaria*, Bl. H. foliis aveniis ovalibus acutis margine recurvis coriaceis infra villosis, corollis glabris (*Corona Ariadna*, Rumph. Herb. Amb. V. t. 172). (1064).

Crescit: in montanis et ad ripas circa Rompien.

Floret: per totum annum.

Nomen: aroy Kilampahan.

Translation: leaves veinless oval acute with margins recurved, leathery, beneath villose, corolla glabrous. (*Corona Ariadna* in Rumphia Herbarium Amboinensis 5. t 172). 1064.

Growing: in the mountains and frequently on the stream banks around Rompien. Flowers the entire year. Local name “Aroy Kilampahan”.

In establishing Section *Eriostemma*, Dr. Schlechter in Botanische Jahrbücher 50 (1913) 106 & 137 (translated for the German as follows:

#### Translated from the German 106:

Section VII. *Eriostemma* the stems and leaves with all surfaces (parts) covered with short soft hairs; in other respects its blooms possess marked sharp characteristics. The gynostegium stands upon a column, which goes down into the crown of the collar of the corolla that is covered with shaggy cottony hairs. The corona scales are comparatively short. The blooms are large or very large with a well-developed thickly hirsute calyx. Type species of the Section is *H. coronaria* Blume.

#### Translated from 135:

Section VII. *Eriostemma* Schlechter. I thought it best to present here this distinctive section *Eriostemma*. This section is so well and sharply different, that one could consider whether or not to regard it as a separate sub-genus. I have so far presented above briefly the main points, but now I wish to present them once again in more detail. In habit there is a strong similarity that can be found with *EU-Hoya*, but the branches are softer and more fleshy and consistently with more or less soft hairs. The peduncles are extraordinarily thick and soft textured, the calyx as with *Pterostemma* more strongly structured, and the large hairy blooms are likewise fleshy. The gynostegium with the



corona scales stand upon a woolly matted column that is the outgrowth formed of the filaments, which are united with the corona tube. The pollinia are distinguished (marked) as opposed to the other *Hoya* species by means of the fact that the translators have undergone a strong development and exhibit a twist; also the retinaculum is rather large. The pollinia are more club shaped and moreover do not have the keel on the outer edge, characteristic of other *Hoya* sections.

We for a long time now have been aware that the species in this section have very little in common with the Genus *Hoya* and so have made the decision to place it into the Genus *statis*. In addition to the differences noted by Dr. Schlechter above, the characters of the Genus *Eriostemma* (Schlechter) Kloppenburg and Gilding are as follows:

By Edward Gilding:

Stems slightly fleshy, 3-10mm thick. All parts exude milky sap when injured. Leaves and stems covered with pubescence except in a few species, in which case the plant possesses a notable covering of indumentum on young growth but becomes glabrous when mature. Stems and the upper leaf surface are of the same color. No noticeable red pigment in young vegetative shoots. Stems twining or prostrate, supple when young, later becoming lenticelate and finally with corky bark. Petiole always developed but short, 1-5cm in length, round in cross section or nearly so without a channel on the upper surface. Leaves fleshy, 2-5mm thick, succulent, opposite in whorls. Leaves faintly glanduliferous on upper leaf surface where it is attached to the petiole. Leaf shape obovate, oblong, or elliptic, but always apiculate at the apex with recurved margins. Nerves always pinnate, sometimes not visible in fresh state. Inflorescence consists of a short peduncle that is of the same thickness and texture of the stem, the end developed into an extremely compressed panicle. Peduncles are either persistent, flowering numerous times or deciduous and flowering only once. Flowers are produced in clusters from the end of the peduncle in numbers from one to twenty but with a mean of six. Pedicels range from 2-15cm in length, thick and supple occasionally pubescent. Calyx of five large lobes usually spatulate, adnate to corolla. Corolla always valvate, thick and rigid. Inside of corolla is ceraceous, being glabrous to densely villose. Lobes of the corolla short to elongate. Corolla lobe posture variable between species from recurved to flat or incurved. Tube short or non-existent, when present it is patellate to cupulate. Base of corolla beneath corona is unique, abruptly cupulate and adnate with column of corona, sericeous in all species. The corona column is also sheathed with corolla tissue that is densely sericeous in all species. Color of corolla ranges from white to green-yellow or orange to deep dull red-brown. The structure forms a deep inverted annulus from which nectar is produced. Corona lobes simple inornate, inner (central) lobe acute and laterally flattened. Outer lobe broad also inornate erect to flat but always broadly obtuse. Usually yellow or yellow with red areas, rarely all white. Pollinaria have rhomboidal retinaculum, with the unique character of twisted translator arms, pollinia always flask-like in shape without obvious pellucid edge frequently found in *Hoya* Br Follicles large, elongate to 35cm and thick in cross-section to 5cm. Outside pubescent or glaucous, mamillate at apex. Unique character of well developed spongiform mesocarp. Seed number 250 to 450 per follicle, freshly ochre-white in color but becoming dull green-blue with age, comate.

Specialized terminology to describe structures of *Eriostemma*:

Exterior Corolla — Corolla tissue that is on the outside of the bloom.

Inner Corolla — Corolla tissue which folded upon itself to form an deep indented annulus.

Operculum — The edge around the base of the visible corona, made of corolla tissue.

Outer Corolla — The portion of the corolla that is not folded upon itself and is generally visible from above, note that this is different from the Exterior Corolla.

Anatomical Feature	Eriostemma Characters	Hoya Characters
Habit	Usually Terrestrial.	Almost Never Terrestrial. Epiphytic.
Stems and Petioles	Mostly Pubescent, Usually Green in Color, young shoots never with high anthocyanin content.	Occasionally pubescent, often aging to brown-tan, young shoots often with high anthocyanin content.
Leaves	Never Flecked, Always Green with pinnate veins and thick in texture.	Occasionally flecked, either palmate or pinnate veins and sometimes thin textured.
Peduncles	Of equal thickness to adjoining stem. Usually short and blunt.	Variable thickness, variable length between species. Generally more slender than those of Eriostemma.
Pedicels	Of equitable length to peduncle and to other pedicels.	Of variable length.
Calyx	Leaflets thick and imbricate at the base, ovate to rotund without acuminate apices	Often elongate with acuminate apices.
Corolla	Distinctively structured Inner corolla that is folded upon itself into an inverted annulus, very woolly inside near base of corona. Whole of corolla large and thick textured.	Corolla near corona base rarely woolly. Very rarely with annulus, when present annulus is shallow or extroverted. Corolla often thick textured.
Corona	Simple inner corona lobe consisting of a laterally flattened tooth-like structure adnate with staminal head. Never erect. Outer corona not hollow, without open channel on underside.	Inner corona of variable shape, sometimes erect. Often hollow with open channel on underside.
Pollinaria	Translator arms very twisted.	Translator arms variable but never twisted to the degree as those in Eriostemma.

Pollinia	Flask-shaped without obvious pellucid edge.	Variable in shape often with a visible pellucid edge.
Fruit	Mesocarp inflated and filled with spongy material. Seeds mature to dull green-blue.	Mesocarp adnate to endocarp. Seeds mature dark-brown to white in color, never dull green-blue.

### **Eriostemma Species**

- Eriostemma affinis* (Hemsley) Klopp. & Gilding. Type: Comins 57. In Kew Bulletin of Miscellaneous Information (1892) 126-127.
- Eriostemma ariadna* (Decaisne) Klopp. & Gilding. Type ? In Prodrum Syst. Veg. 8 (1844) 635.
- Eriostemma ciliata* (Elmer ex Burton) Klopp. & Gilding. Type: Elmer 11072 (A). In The Hoya 9(4) (1988) i.
- Eriostemma coronaria* (Blume) Klopp. & Gilding. Type: t. 1063 in Bijdragen tot de Flora Nederlandsch Indie (Bijdr. 1825).
- Eriostemma gigas* (Schlechter) Klopp. & Gilding. Type: Schlechter 19289. (B) In Botanische Jahrbücher 50 (1913) 136.
- Eriostemma guppyi* (Hemsley) Klopp. & Gilding. Type: Guppy 188. In Icones Plantarum 23 (1892) 2247.
- Eriostemma hollrungii* (Warburg) Klopp. & Gilding. Type: Hollrung 661. In Repertorium Specierum novarum 3 (1907) 342.
- Eriostemma lauterbachii* (Schumann) Klopp. & Gilding. Type: Lauterbach 930 (B). In Dictionary of Gardening 1 (1885).
- Eriostemma lutea* (Kostel.) Klopp. & Gilding. Type: 1083. In Algem. Med.-Pharm. Fl. 3:1834.
- Eriostemma madulidii* (Kloppenburger) Klopp. & Gilding. Type: Bolster 357. In Fraterna 3 (1990) IV.
- Eriostemma noeguiniensis* (Engler) Klopp. & Gilding. Type ?. In Botanische Jahrbücher 7 (1886) 471.
- Eriostemma peekelii* (Markgraf) Klopp. & Gilding. Type: Peekel 1047. In Notizblatt des Botanischen und Museums zu Berlin-Dahlem 10:119-110: 1927.
- Eriostemma pulgarensis* (Elmer) Klopp. & Gilding. Type Elmer 12985. In Leaflets of Philippine Botany 10:3588-3590:1938-39.
- Eriostemma purpurea* (Blume) Klopp. & Gilding. Type t. 182. In Rumphia 4:31-32:1848.
- Eriostemma subcalva* (Burkill.) Klopp. & Gilding. Type Hollrung 28 (?). Kew Bull. (1901)
- Eriostemma velutina* (Wight) Klopp. & Gilding. Type: Wall 39. In Contributions to the Botany of India t. 8150:35-36:1834.

**New considerations:** I feel the section *Skinostemma* could be eliminated and the monotypic species *Hoya heuschkeliana* Klopp. since it has a bilobed corona could be placed in the Section *Acanthostemma* (Bl.) Klopp, Subsection *Externatae* Klopp.. That is if one wishes not to make the urceolate corolla a leading factor. Along the same line of reasoning the Section *Peltostemma* Schlechter could be eliminated and its species/species since they are also bilobed could be transferred to the Section *Acanthostemma*.

Borneo is turning up some interesting different, and transitional species which will need consideration. To date this includes *Hoya kloppenburgeri* Green and the soon to be published species *Hoya gildingii* Kloppenburg. They bridge several different present sections.